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No. IV. OF VOL. II., 1925. **LONDON, SATURDAY, JULY 25, 1925.** **Pp. 104—Price 1s.**
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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

AN ADDRESS on the Evolution of a Health Resort. By F. G. THOMSON, M.A., M.D., M.R.C.P. 163

FIFTY YEARS of Progress in Public Health. By Sir GEORGE NEWMAN, K.C.B., M.D., F.R.C.P. 165

THE CROONIAN LECTURES on Some Disorders of Motility and of Muscle Tone, with Special Reference to the Corpus Striatum. By S. A. KINNIER WILSON, M.D., B.Sc., F.R.C.P. Lecture III.—(*Illustrated*) 169

ORIGINAL ARTICLE.

A Case of Hereditary Deforming Dyschondroplasia. By A. G. ORD, F.R.C.S.—(*Illustrated*) .. 178

MEDICAL SOCIETIES.

Pathological Society of Great Britain and Ireland 179

REVIEWS AND NOTICES OF BOOKS.

The Ministry of Health. By Sir Arthur Newsholme, M.D. 180

Die Chirurgie der Brustorgane. By Ferdinand Sauerbruch 180

Practical Chiropody. By E. G. V. Runting 180

Lister and His Achievement. By Sir Wm. Watson Cheyne, Bt., F.R.C.S., F.R.S. 180

Surgical Pathology. By Prof. William Boyd, M.D. 181

A Text-book of Pathology. By Prof. J. Martin Beattie, M.D., and W. E. Carnegie Dickson, M.D. . 181

Pathogenic Micro-organisms. By Prof. W. H. Park, M.D., Anna W. Williams, M.D., and C. Krumwiede, M.D. 181

Allen's Commercial Organic Analysis 181

LEADING ARTICLES.

THE CANCER VIRUS 183

THE BRITISH MEDICAL ASSOCIATION AND INDIVIDUAL DEFENCE 183

THE EVOLUTION OF HUMAN VISION 184

PROPOSED UNIT OF CLINICAL PATHOLOGY AT WESTMINSTER HOSPITAL 185

ANNOTATIONS.

Internal Migration and the Death-rate.—(*Illustrated*) 186

Monkeyville 187

Experimental Pathology of Epidemic Encephalitis .. 187

Hygiene in Factories 187

The Englishman's Height 188

Hospital Cooks and Cookery 188

Poor-law Hospitals and Tuberculosis 189

MODERN TECHNIQUE IN TREATMENT.

CXXXII.—The Treatment of Epidemic Diarrhœa. By WILFRED J. PEARSON, M.D., M.R.C.P. 189

SPECIAL ARTICLES.

Some General Reflections on Public Health Administration. By J. H. L. CUMPSTON, M.D., D.P.H. II.—The Medical Practitioner and Public Health 191

British Medical Association: Annual Meeting at Bath: Representative Meeting.—Research Scholars.—Oblique Advertising.—Locum-Tenents.—Health Insurance Service.—Appeal to the High Court.—Individual Medical Defence 195

Royal Commission on National Health Insurance: The Voluntary Hospitals' Evidence 181

Convention of English-Speaking Ophthalmological Societies: Evolution of Binocular Vision.—Microscopy of the Living Eye—Constitution of Future Conventions.—Visits and Functions 200

PUBLIC HEALTH SERVICES.

Reports of Medical Officers of Health: Kensington.—Poplar.—Westminster.—Stoke Newington.—West Ham 193

Infectious Disease in England and Wales 195

THE SERVICES.

Royal Naval Medical Service.—Royal Army Medical Corps.—Royal Air Force 204

CORRESPONDENCE.

Is There a Seasonal Periodicity in Scrum Rashes? (Dr. John Brownlee) 205

Oatmeal and Rickets (Dr. J. W. Tomb) 205

The Danger of Incompatibility in Blood Transfusion (Dr. E. L. Hunt). 205

PARLIAMENTARY INTELLIGENCE.

House of Commons: Publication of Trevethin Committee Evidence.—Uninsured Persons.—Summer-Time Bill.—Therapeutic Substances Bill.—Diseases of Animals Bill.—Civil Service Pensions in India.—Telephones and Rural Medical Service 206

MEDICAL NEWS.

No Tax on Tourists in France 195

Association Stomatologique Internationale 195

The Contribution of Optical Instrument Makers to Medical Science 209

Beit Fellowships 209

Royal Society of Medicine 209

Accumulated Funds of Approved Societies: Deputation to the Minister of Health 209

Royal Commission on National Health Insurance 210

Canadian Medical Association: Annual Meeting at Regina 210

Climatological Congress at Davos 210

Amsterdam Industrial Congress 210

The late Dr. G. S. Sims .. 210

Faculty of Medicine, Vienna 210

Manchester Babies' Hospital 210

Salvation Army Mothers' Hospital Extension 211

Professional and Business Women's Hospital League 211

INDEX NOTICE.

THE LANCET, Vol. I. 1925 189

NOTES, COMMENTS, AND ABSTRACTS.

Infection by Books. By J. E. MCCARTNEY, M.D., D.Sc. 212

Health and Homecrofting 212

Medical Diary 211

Appointments 211

Vacancies 211

Births, Marriages, Deaths 211

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Contents:

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By L. Wynn Houghton, Assistant House Surgeon, Guy's Hospital.
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PHYSICIAN, ROYAL UNITED HOSPITAL, BATH; CONSULTING PHYSICIAN, MINERAL WATER HOSPITAL, BATH.

THE history of a town that has been closely associated with the treatment of disease for nearly 2000 years, and probably longer, naturally possesses many features of medical interest, and it may not be out of place to-night, at the commencement of this meeting, to refer to certain phases of the evolution of Bath as a health resort, and to certain of the characters, medical and otherwise, who have played their part in its medical history.

EARLY DAYS.

Though the hot springs have been used in the treatment of disease ever since the Roman occupation, it was not till the middle of the sixteenth century that their therapeutic properties engaged the serious attention of the medical profession, and our knowledge of the actual practice of medicine in Bath remains very fragmentary till about the time of Queen Elizabeth, when its reputation as a resort for visiting patients first became established.

The primitive conditions, however, which obtained in the time of the late Tudors and early Stuarts were such that one imagines nothing but dire necessity would have caused anyone to visit Bath at that time. The town itself was one of the meanest in England, and the streets are said to have been a succession of dunghills, pigsties, and slaughter-houses. The baths themselves consisted of dilapidated, ill-kept, dirty pools, open to the air, and surrounded only by a low parapet, over which the more idle and inquisitive of the inhabitants were accustomed to view the proceedings at their ease and leisure. Men and women bathed together, naked, at nearly all times of the day and night, and disorder of all kinds was rampant. The baths are said to have resembled a veritable bear-garden, and cats, dogs, and even human bodies to have been hurled into the bath while people were bathing in it.

In spite of all the discomforts and positive dangers, Queen Anne of Denmark, the wife of James I., decided to take a course of baths in the bath known as the King's Bath. Unfortunately, Her Majesty had a somewhat alarming experience, as a ball of fire is said to have risen from her feet and spread out all over the surface of the bath. This remarkable phenomenon, which one can only suppose was an ebullition of marsh-gas rising from the mud, which was disturbed by the lady's feet, so alarmed the Queen that she refused to bathe there any more, and was with difficulty persuaded to finish her course of treatment in an adjoining bath, since known as the Queen's Bath, where she was assured such cataclysmic disturbances were never known to occur.

THE STUART COURT.

The reign of Charles II., however, marked the commencement of an entirely new phase in the history of the town. Whereas people had hitherto come solely for reasons of health, they now began to come for pleasure. In 1663 Charles II. formally removed his Court to Bath, and the concourse of people was so great that not only the town, but the surrounding villages also, were crowded with visitors. Though certain improvements had been effected in the conduct of the baths, and though quite a number of Bath physicians had by this time written more or less learned books on the action of the waters, the scene depicted in the print of the King's Bath in 1667 hardly suggests that balneological treatment was as yet regarded by the public with that respect which it deserved.

The proceedings appear to have been looked upon more as a popular entertainment than as a remedy for disease, and the antics of children diving for pennies, and of their elders indulging in fancy forms of swimming, appear to have afforded more amusement to the onlookers than to the unfortunate patients. The number of the latter, however, was steadily increasing, and included more particularly cases of rheumatism, gout, diseases of the skin, diabetes, dropsy, and paralysis. The reputation the waters had acquired for the treatment of sterility induced the Queen, Catherine of Braganza, to take a course of baths in the hope of providing an heir to the throne, and thereby regaining the waning affections of the errant and profligate Charles.

Besides the King and Queen, the Duke of York, and Prince Rupert, we learn that King Charles's somewhat Oriental *ménage* included Lady Castlemaine, the Duchess of Cleveland, and the Duchess of Portland, two others of Charles's acknowledged mistresses, and last but not least, the beautiful Miss Stewart. This pleasant little coterie, together with the rest of the Court, lodged, and apparently lived a somewhat hectic life, at a house known as Abbey House, adjoining the King's Bath.

DR. PIERCE AND DR. GUIDOTT.

Abbey House, known also as the Royal Lodgings, was owned by a Dr. Robert Pierce, the most successful practitioner in Bath of his day, and used by him as a sort of clinic to accommodate many of his more important patients.

Dr. Pierce, whose list of "Cures wrought by God's Blessing on the Directions of Robert Pierce, M.D.," shows him to have been a practical, painstaking, and careful physician, was evidently a firm believer in the proper selection of suitable cases for treatment at Bath. This is shown by his account of a certain Mrs. Frisby, sent to him from Northamptonshire, suffering from palsy and loss of speech, of whom he says:—

> "On bathing she apparently grew worse, especially in her speech, which very much discouraged her in proceeding farther. And indeed I was not very importunate with her for her longer stay, lest the Great Bell should have rung out for her here; for then inquiry would have been made, Whose Patient she was? Not what Distemper she had? or whether a due method had been used for her recovery; but with the Vulgar (who measure all things by the Success) the Physician that does not cure shall be sure to have the Reputation of killing the Patient that dies, be the disease or the patient never so much incurable. I return'd her back, therefore, to him that sent her hither, with advice to use Antiscorbuticks and Cephalicks, and never since heard anything of her."

The subject of after-treatment also received his most serious attention; one of his favourite prescriptions being a "sacculus," or in other words a muslin bag, containing various herbs, to be suspended in a barrel of beer.

Dr. Pierce's great rival was a Dr. Thomas Guidott, a distinguished graduate of Oxford, whose scientific bent induced him to carry out elaborate and painstaking researches on the chemical composition of the waters. Among his other activities he found time to write biographical accounts of all the doctors in Bath between the year 1600 and 1680. His biographies of some of the better known doctors of his time, such as Dr. Jorden, Dr. Bave, and Dr. Venner, show them to have been men of the highest integrity and professional attainments.

A GENERAL CASINO.

Though Queen Catherine of Braganza's hopes were not realised, her successor, Queen Mary of Modena, wife of James II., who bathed in the Cross Bath for a similar reason, was more fortunate, a son being born to her in the ensuing year. This was regarded

as a most remarkable and convincing proof of the efficacy of the waters, and was suitably commemorated by placing an ornamental cross in the centre of the bath, with an appropriate inscription recording the circumstances.

Long before these events took place, however, the city had reached the acme of its fame, not only as the resort of the sick and ailing, but as the periodical visiting place of all who aspired to take any position whatever in the world of fashion. During the reign of Queen Anne, Bath became a sort of general casino for the whole kingdom. The Queen herself, who is said to have been such a martyr to gout that she was unable to stand during her coronation service, paid several visits, and for the next 120 years or more there is hardly a single person of distinction, from Royalty downwards, whose name is not in some way or another connected with visits to Bath, either for health or pleasure.

Thanks to the numerous authors and dramatists, such as Steele, Defoe, Goldsmith, Sheridan, Anstey, and others, who habitually visited Bath in the eighteenth century, the social habits and customs of this picturesque period are peculiarly well known to us. Whatever their other predilections may have been, we learn that the first and chief preoccupation of the majority of the company was the daily visit to the bath.

BATHS FOR DIVERSION.

In addition to those who took their baths under medical orders, many others bathed for diversion. The bath became a sort of fashionable parade which few cared to miss. The simple bathing dresses in vogue at the end of the seventeenth century were gradually replaced by more elaborate costumes, till eventually both men and women took to the water arrayed in the height of fashion. Ladies of distinction bathed in state, and were attended by the daughters of prominent citizens. Those who desired them were supplied with small floating trays, on which they placed nosegays, sweetmeats, snuff, and such trifles as face-powder and patches, to replace those dislodged by the moisture. The rule that the gentlemen should remain at one side of the bath and the ladies at the other seems to have been honoured more in the breach than in the observance. The patients were conveyed to and from the bath in sedan chairs, which in the case of the ladies were, to use the words of a contemporary French writer, "hermetically sealed when the occupants were old, ugly, or prudish, but artistically penetrable when they were finely formed."

Water-drinking, which by this time had become an established part of the treatment, took place later in the morning at the old Pump Room, which was replaced at the end of the century by the present structure. It was here that, to the accompaniment of a prodigious amount of gossip, scandal, and general disturbance, the prototypes of Lady Teazle, Lady Candour, and Mrs. Malaprop were to be found daily, drinking their quantum of water, and at the same time unsuspectingly providing Sheridan with the material for his plays.

The general régime and amusements of the patients, which after all constitute an important factor in their "cure," need only very brief reference. Fortunately we are able to get some idea of them, even if it is somewhat distorted, from the caricatures of Rowlandson and other cartoonists of the period. Following the parade in the Pump Room, public breakfasts formed an important feature. Later on in the day, after promenading in the parades, or adjourning to the various coffee-houses to hear the latest news, gambling, which in the time of the Georges was an almost universal passion, occupied the attention of the majority. Music, the drama, and art occupied the attention of the more intellectual of the company. Concerts were held daily, and it was while singing at one of those that the beautiful Miss Linley engaged the affection of the youthful and impetuous Sheridan.

CRITICS, FRIENDLY AND OTHERWISE.

The presence of such a large number of invalids from all parts of the country naturally attracted a great many doctors, many of whom practised in Bath during the season, and in London or elsewhere during the rest of the year. Amongst these there were probably a good many whose professional reputation and standard of ethics left something to be desired, and it is not surprising that in an age when wit, satire, and caricature were the predominant features in the literary world, they came in for their full share of ridicule and criticism. Thus Steele, writing in the *Guardian*, relates what he alleges to have been his own experience of the methods adopted for soliciting practice, saying:—

> "The physicians here are very numerous, but very good-natured. To these charitable gentlemen I owe that I was cured in a week's time of more distemper than I ever had in my life; they had almost killed me with their humanity. A learned fellow lodger presented me a little something on my first coming, to keep up my spirits; and the next morning I was so much enlivened by another, as to have an order to bleed me for my fever. I was proffered a cure for the scurvy by a third, and had a recipe for the dropsy gratis before night. In vain did I modestly decline these favours, for I was awakened early in the morning by an apothecary, who brought me a dose from one of my well-wishers. I paid him, but withal told him severely that I never took physic. My landlord hereupon took me for an Italian merchant that suspected poison; but the apothecary, with more sagacity, guessed that I was certainly a physician myself."

The most bitter criticism of the local doctors comes from Smollett, the author of "Peregrine Pickle" and "Roderick Random," both of which deal largely with the social life of Bath. Smollett himself was a doctor of medicine, and at one time essayed to practise in the town, and actually wrote a book on the external use of Bath waters. His lack of success appears to have roused feelings of intense bitterness against his more fortunate rivals, whom he describes as "a class of animals who live in the place, like so many ravens hovering round a carcass, and even ply for employment like scullers at Hungerford Stairs." In the circumstances, however, Smollett's virulent attacks on his own profession need hardly be taken too seriously, more especially as he shows a sordid tendency to paint all his characters in the most unfavourable light.

A more humorous parody on the ways of some at least of the Bath physicians of the eighteenth century is contained in Anstey's "New Bath Guide," which, in a series of letters, relates the adventures of a somewhat unsophisticated family during a visit to Bath for the sake of their health. In a letter to his mother, written on his arrival, Mr. Simpkin Blunderhead writes of his doctor:—

> "He determined our cases at length (God preserve us);
> I'm bilious, I find, and the women are nervous;
> Their systems relax'd, and all turned topsy turvy,
> With hypochondriacs, obstructions, and scurvy;
> And these are distempers he must know the whole on,
> For he talked of the peritoneum and colon."

According to Anstey, none of the doctors indulged in the baths they so freely prescribed for the patients, thus:—

> "Though many a skilful and learned physician,
> With candour, good sense, and profound erudition,
> Obliges the world with the fruits of his brain,
> Their nature and hidden effects to explain,
> Not one of the faculty ever has try'd
> These excellent waters to cure his own hide."

Though the criticisms of Steele, Smollett, and Anstey were probably throughly well deserved by those to whom they were directed, it must not be supposed that all the physicians in Bath were tarred with the same brush. On the contrary, many of them were men of the highest standing and repute, hardly to be distinguished, as Barbeau says, from the best of their colleagues in London. Among them may be specially mentioned Dr. Hartley, ranked by Coleridge with Milton, Newton, and Priestley; Dr. Cheyne,

of whom Pope said there was no honester man or truer philosopher; Dr. William Oliver, a founder, and the first physician to the Mineral Water Hospital; Henry Harrington, renowned for his literary ability as well as for his knowledge of medicine; William Falconer, the physician to Pitt, who shares with Priestley the distinction of being the discoverer of oxygen. Last, but not least, of the eighteenth century physicians, we have Caleb Hillier Parry, who practised in Bath from 1780 to 1816, and whose contributions to medical literature, no less than his skill in practice, entitle him to rank as one of the most eminent physicians of his day.

LATER DEVELOPMENTS.

Though time will not allow of any references to the many distinguished Bath patients in the eighteenth century, one may specially mention John Hunter, who paid visits in 1777 and 1778 for the relief of pain associated with the aortic aneurysm which eventually caused his death. His condition being much worse in 1785, he hastened back to Bath, but became progressively worse, and died in London some months later. Though the vogue of Bath remained undiminished during the earlier years of the nineteenth century, important changes were gradually taking place in its fortunes, both from a social and medical point of view. Increasing facilities for travel and the wider diffusion of wealth began to lead people further afield, and Bath gradually lost its unique position as the chief, and in fact the only, resort of fashion in this country. On the medical side changes no less striking were also in progress. Balneological treatment began to be carried out on much more serious and rational lines. The promiscuous treatment of all types of patient in a common bathing pool, open to the gaze of an idle and inquisitive public, ceased with the erection, in 1798, of private suites of baths, which were the forerunners of the present installation, and in which various forms of treatment could be given to suit individual cases. The study of hydrology was being actively taken up, both in this country and on the continent of Europe.

The work of Dr. Currie of Liverpool, and later of Priessnitz in Silesia, called attention, in the first place, to the possibilities of effective treatment by the hot and cold application of ordinary water. Side by side with this development of hydrotherapy the study of the specific therapeutic properties of the various natural waters steadily advanced, till eventually that branch of therapeutics now known as medical hydrology may be said to have gradually emerged from a form of empiricism, based largely on tradition and superstitious belief, to a recognised branch of scientific medicine.

Fifty Years
OF
PROGRESS IN PUBLIC HEALTH.

Being the Presidential Address delivered to the Sanitary Science Section of the Congress of the Royal Sanitary Institute at Edinburgh on July 21st, 1925.

BY SIR GEORGE NEWMAN, K.C.B., M.D. EDIN., F.R.C.P. LOND.

[Sir George Newman introduced an eloquent address on the progress of public health during the past half century by detailing the various factors which culminated in the Public Health Act of 1875, considering these also in the light of future developments. He showed how enfranchisement of the town labourer in 1867, reform in the civil and military services, and the Education Acts were followed by further extensions of the franchise, which culminated in 1918, when the number of Parliamentary voters, now of both sexes, was trebled. He indicated the aspirations produced, as well as the disappointments which accompanied the liberal reforms, and referred particularly to the disease and despair which came in the train of the great industrial revolution. He showed how Chadwick's monumental "Survey" led to the Royal Commission on the Health of Towns and the Public Health Act of 1848, and how the influence of Bentham's utilitarian philosophy, of Owen, Cobbett and the Chartists, combined with the effects of the splendid reports of Simon to the Privy Council, and the work of Arnott, Kay, Southwood Smith and Greenhow to prepare the public for the developments to follow the Public Health Act of 1875.

Sir George Newman then sketched vividly the new influences after 1875, showing how two years after the passing of the Act the discovery of bacterial causes of disease revolutionised medical views and practice so that the centre of gravity turned from environment to infection "not only to the agents of infection but to the conditions of persons and environment, the lack of resistance which favoured those agents." There was a rapidly growing knowledge and sense of physiology which has continued to exert, during the last fifty years, an effect on the whole outlook of Preventive Medicine, while social emancipation has accompanied a rising standard of education and material comfort. It is now known that the chief defence against disease is not changed environment but the body of man, and secondly that obedience to the laws of physiology is necessary both for the maintenance of the body in health and for its full capacity and effective use.

The first section of the address closed with the statement that utilitarianism, environment, infection, physiology, and social emancipation have exerted an active influence in the past and are likely to achieve even more in the immediate future. Sir George Newman continued:—]

THE RESULTS OF THESE REFORMS.

Looking back from 1925, we may well ask, What has been the result? Well, first there has been a decline in the death-rate. In 1871–80 it was 21, and in 1924 it was 12; in the same period the infant mortality-rate, a most sensitive index of national health, was brought down from 149 per thousand born to 75. Expressed in another way, the expectation of life for every child born in Britain to-day is approximately 12 years longer than that of its grandfather.

The life-table published by Sir William Hamer in 1923 gives the actual figures for London:—

*London Life Table, 1841–1922.**

Period.	Expectation of life (years).		Period.	Expectation of life (years).	
	Males.	Females.		Males.	Females.
1841–50 ..	34·6	38·3	1891–1900 ..	41·2	45·4
1851–60 ..	36·4	40·4	1901–10 ..	47·2	51·9
1861–70 ..	35·7	39·9	1911–12† ..	49·5	54·5
1871–80 ..	38·9	42·4	1920–22 ..	53·8	59·1
1881–90 ..	40·1	44·5			

* Annual Report of London County Council, 1923, Ch. xxiii. and xxiv., Report of the County Medical Officer of Health, p. 13.
† The last pre-war years for which comparable figures are available.

Mr. W. Jones, the secretary of the Public Health Department of Glasgow, has recently shown that in 1870–72 the male infant born in that city had an "expectation" of 31 years, which in 1920–22 had been raised to 48 years, and the female infant had risen from 33 to 52 in the same period. It is significant that the "expectation" of life was better in Glasgow in 1821–27 than in 1870–72.

Then, in the second place, there has been a reduction in sickness and invalidity from certain diseases. In 1875 *enteric fever* accounted for 370 deaths in each million, last year the 370 had fallen to 12. Its incidence in the South African war was 28·5 per cent. of troops, in the European war 1 per cent. In 1875 there were 1500 deaths attributed to *typhus* in England and Wales (which had been differentiated from enteric in 1850); in 1924 there were only 5. But 100 years ago, in London and Edinburgh, typhus was endemic, with periodic epidemic outbursts. "The disappearance of typhus and relapsing fevers from the observation of all but a few medical practitioners in England, Scotland and Ireland," says Creighton, "is one of the most certain and most striking facts in our epidemiology," and he attributes their disappearance to better housing, cheap food, and increased wages. The *tuberculosis* death-rate is declining rapidly and with increasing velocity. In 1847 the death-rate per million from consumption was 3189, in 1875 it was 2313; and in 1924 it had fallen to 801. It is hardly too much to say that if this decline should continue more or less along the line it has followed, tuberculosis will have become a rare disease before the end of the present century.

Small-pox was a national scourge a century ago; to-day it is the perquisite of those who elect to have it. Last year Sir Clifford Allbutt declared that the almost complete abolition of *chlorotic anæmia* of young women is one of the most remarkable issues of a single generation of modern preventive medicine. All this has meant an immense saving of human life, an increase of human capacity and national wealth, an incalculable extension and enlargement of happiness and contentment.

But there is another epoch-making effect. The preventive medicine of 50 years has, in the words of Rudyard Kipling,

> "Smote for us a pathway
> To the ends of all the earth."

In some ways the most wonderful medical triumph of the past half century has been the discovery of the means of *the control of the tropics*. It is true that we are yet a long way off complete control, but the causes of disease have been found and the means of stamping them out demonstrated. *Famine* stands in the front line of the captains of the men of death—and the advance in methods of irrigation and transport of food have greatly reduced it and played a prominent part in the establishment of public health. Close behind famine follows disease. The discovery of the causes of malaria, of yellow fever, of plague, of cholera, and of sleeping sickness is common knowledge. Yet all these discoveries belong to the period since the Public Health Act of 1875.

Malcolm Watson demonstrated the possibility of preventing *malaria* in the Federated Malay States by banishing the anopheles' breeding places by the clearance of the coastal forest and subsoil and surface drainage. In India and elsewhere this technique may prove inexpedient or insufficient, unless supplemented by a direct attack on the mosquito in its larval or adult stage, or screening habitations or persons from its invasion, or treating cases or carriers. Indeed, the recent Malaria Commission of the League of Nations in Italy, Russia, and Eastern Europe has recommended for countries with incomplete public health services and limited funds the urgent necessity of abstaining from "radical" engineering measures and adopting "primary" public health measures of ascertainment of infection, treatment and after-treatment of patients and carriers, and dealing directly with infected houses and mosquitoes—in a word, quinine, the attack on the mosquito, the protection of the individual, and general sanitation.

The work of Gorgas in stamping out *yellow fever* in Havannah and on the Panama Isthmus is well known. By a strict discipline of quarantine, hospital isolation, drainage, sanitation, and mosquito screening and destruction, he was able to eliminate this disease, even though an immigration of non-immune population was continually occurring.

Practical measures against *sleeping sickness* (trypanosomiasis) have been taken effectually in the Cameroons, the Congo, Tanganyika, Kenya, and Uganda. They consist of the systematic surveys (clinical and bacteriological) of the infected population, followed by curative and prophylactic use of atoxyl in large doses; the separation of the healthy from the infected, with the isolation, if necessary, of whole villages or the migration of sections of the population from areas or streams affected with the tsetse-fly; sanitation of villages and improvement of diet; the clearance of banks of water-courses, paths, roads and settlements of all brushwood, and their proper drainage; and lastly, fly destruction by means of bird-lime or otherwise. These methods have completely suppressed sleeping sickness in the Portuguese Island of Principe, off the west coast of Africa, and proved effective in terminating recent disastrous epidemics on Lake Victoria Nyanza, and elsewhere in equatorial Africa. In this way hundreds of thousands of lives have been saved, and the way in which the tropics can be brought under control has been demonstrated. This problem of tsetse-fly is, in the opinion of the East African Commission (1925), "probably the most serious threat to the population in our East African territories. . . . We regard the tsetse domination as constituting a menace not merely to East Africa, but to all those countries which look to East Africa as the source of supply of food and raw materials."

All this can mean only one thing. The last half century has proved beyond doubt that nationally and imperially preventive medicine has now become practical politics. The trail has been blazed. It remains for this country to use it, apply it, and extend it—and all of it—with courage and wisdom, to its national and imperial problems as the sound and economic policy. A stunt here and a stunt there will not suffice—it should be organised as a whole, as an integral factor in state-craft.

THE FUTURE.

Let us turn to the future. Much remains to be done. For whilst progress has overcome many diseases, others remain prevalent and destructive. In 1924, in England and Wales, respiratory diseases caused 82,000 deaths, diseases of the heart and circulation 79,000, cancer 50,000, nervous diseases 47,000, tuberculosis 41,000, and influenza 19,000. These are very formidable enemies, responsible for 65 per cent. of our mortality, and we cannot yet defeat them. We still lose nearly 3000 mothers in childbirth, and more than 50,000 infants before they have completed their first year, and in both categories the maimed far outnumber the dead. We still have 40 per cent. of the deaths occurring under 50 years of age. In 1924 the sickness among insured persons only entailed more than 23 million weeks of lost work, equivalent to 447,000 years, or to 447,000 persons off work for a year. It is a very serious, and largely a preventable, drain upon national resources, costly and wasteful in many ways. In a word, national ill-health loses time and reduces production, as well as resulting in suffering, discontent, and premature death.

The history of the evolution of our system of public health since 1875, and its effects reveals, as we have seen, some of the chief influences which have played a predominant part. We must continue to be utilitarian in the best sense of the term. We must also be more economical. Our financial resources must be husbanded and our revenue not mis-spent or frittered away. I am convinced that the ratepayer is reasonable when he asks for equally good results at less total cost. In fact, it is now a national necessity that money must be saved and

not wasted; production must be increased and not diminished; personal responsibility stimulated and not weakened.

But the past teaches us we must still build upon a sanitary foundation; we must, like Harvey, "search and study out the secrets of Nature by way of experiment," and by research learn more of the hidden paths of infective processes; we must teach and practise physiology; and above all, we must understand the social habits, aspirations, and psychology of the people. Yet for public practitioners of the science and art of preventive medicine all this is not enough; it is not close enough down to the business we have in hand. These high things must be harnessed in the statesmanship and technique of health administration, and there seem to me to be three main lines along which there is urgent need to advance.

1. A NEW LOCAL UNIT OF SANITARY GOVERNMENT.

The present system of local health government in England is like an Egyptian palimpsest, composed of several layers of design lying one upon the other. At the bottom there are the Poor-law unions, next above them and three times more numerous are the local sanitary authorities, superimposed upon which come the local education authorities (318), then the insurance committees numbering 145. Thus the whole country is mapped out four times over, but the charting has been done by different hands, at different times and for different purposes, and hence arises duplication, overlapping, and confusion. There is confusion in areas and authorities, but there is no less confusion in the family. There are four local authorities concerned with maternity and infancy; three with children of school age; five authorities deal with persons of unsound mind or mental deficiency; four authorities are concerned with "sick persons"; three with the aged poor; and four with the able-bodied poor. It is all anomalous, extravagant, and redundant, with a result which is ineffective and financially wasteful.

What we seem to need is, first, *a single unit of health government* with necessary subcommittees for particular purposes. The principles which should guide us in devising such a local authority are (*a*) the concentration, as far as practicable, in one authority in each area, of the responsibility for all administration of health services from local rates, with or without Exchequer grant in aid; (*b*) the association of the work of the Poor-law and insurance with the public health service, and the use by that service for the whole community of coördinated medical institutions both voluntary and municipal; and (*c*) the unification in appropriate committees of the local authority of all public medical provision for the sick and infirm of all ages. Clearly, there would be advantage in thus having one authority for all health purposes—and towards unification of this nature many are looking. But the question is large and complex, and there are many considerations to which regard must be paid in prescribing a unit of sanitary government, including its history, size, population, urbanisation, character of industry and society, intercommunication, rating, relation to local and central government, and so forth. If a large local unit be contemplated it would be necessary to provide for the encouragement of a consciousness of community of interest and aim in the smaller contributory or constituent divisions, with appropriate delegation of powers or functions in accordance with service to be rendered. The large autonomous body might in that way delegate some of the actual detail work to the more local bodies. There is a second, somewhat similar, common-sense requirement—namely, *uniformity of administration*—in all comparable areas. All through the country, and in all departments of State medicine, there is need for introduction of accepted standards and a larger measure of equalisation and uniformity of central and local action, yet with ample opportunity for variety dependent on local needs and circumstances. There remains a third principle which the profession must not allow itself to forget—namely, that the local unit of health government must be *representative* of the will of the people as a whole. It cannot be wholly medical in personnel or in purpose. It must be comprehensive and disinterested. "Our trade our politics" is never sound state-craft.

Now, in devising this reform the medical profession must, in the interest of the State not less than the profession, take their share, exchanging with the layman their views on many points—the nature of the authority, its membership, the question of the coöption of experts, finance, medical participation, the respective functioning of the different local committees, the use and adaptation of existing institutions and their economical arrangement, and the place and character of the domiciliary medical services.

The present scheme of local sanitary authorities was conceived as far back as the Royal Sanitary Commission of 1843, was actually recommended by the Commission of 1869 and legislated for in the Public Health Act of 1872, which established as many as 1539 local sanitary authorities in England and Wales, which now number 1857 (excluding the 63 counties). Experience in health administration and other forms of governance have proved the grave disadvantages of small units of local government, and the trend has been to enlarge them. The Poor-law Amendment Act of 1834 reduced the units of Poor-law administration from 16,500 to 660; the Education Act of 1902 reduced the unit of education administration from 2469 school boards to 318 local education authorities; the new Rating and Valuation Bill would reduce the units of local rating from 12,882 to 648. These reductions unquestionably make for efficiency and economy. The next step, and of its urgency there is general agreement, is to reduce the 1900 local health authorities in a similar drastic way, coördinating the duties of the smaller ones with those of the larger ones. We must not forget that the present scheme of local sanitary authorities (now 50 years old) has rendered great pioneer service and has given sanitation an invaluable local setting. But under modern conditions the disadvantages are overwhelming. In the smaller bodies there is all too often incompetency both of personnel and officers, combined with inadequacy of remuneration of the officers; there is duplication of officers and institutions leading to extravagances, waste, and confusion; local and personal considerations predominate, with the result that self-interest is cultivated, vested interest created, and public interest neglected; and there is lack of uniformity and equality in the administration of sanitary law common to the whole State. Yet epidemic disease spreads through large communities rather than small, and is not confined by parochial boundaries—e.g., it is impossible to grapple with small-pox or typhoid fever if one small area differs from another in the practice or neglect of essential methods. Water-supply, sewerage, river pollution, and hospital provision must also be dealt with on a general and not a particular scale. It is true, of course, that these features are characteristic of some of the smaller authorities only, but these smaller authorities are upwards of 1000 in number, and their disabilities are injuriously affecting the entire public health service of the nation. There are 1455 posts of medical officer of health, but only 350 of them are whole-time, so that 1100 medical officers of health are medical practitioners who, with all their goodwill, can only devote part of their time and energy to the public health service. Efficiency which is dependent upon the effect of divided loyalties or personal good nature can never be efficiency. In fact, it can only be, as Sir Lyon Playfair told the House of Commons in 1888, "desperately inefficient." "Wise men," said Sir John Simon long ago, "will not expect that a great national reform shall be achieved by casualties of good nature."

2. EFFECTIVE COÖRDINATION OF MEDICAL SERVICES.

I suggest that the second step in the future reform is the effective bringing together in each sanitary area of the various branches or forms of public medical service in such a way as to make them work as one connected and coöperative scheme. In science, as in war or in football, team-work is the condition of success. We must not only build on the foundations of others, but join hands with our own contemporaries. We have seen that historically the existing public medical services are the hospital, the Poor-law, factory supervision, the public health service (sanitary environment, infectious diseases, food-supply, and maternity), the school medical service and national health insurance. The problem of the complete physical supervision of a people is thus met or nearly met. Maternity, infancy, the school-child, the worker, the insured person; poverty, sickness, and old age; and all through life the essentials of a healthy environment—these things are now all separately provided for. But there are three outstanding defects. First, the provision made is as yet incomplete and inadequate; secondly, no provision is organised by law for children between infancy and school age, or for adolescents from 14 to 16 years of age (between the end of school life and the beginning of insurance); and thirdly, though we have six public medical services, there is not a sanitary area in the country in which we are at present getting full inter-coördination or even unification of administration. There is far too much of the water-tight compartment, and too many different authorities working the services. Yet until there is linking up and concentration of all forces on the focal point, it is idle to expect full effect. Though we have in England and Wales upwards of 3400 hospital institutions with 350,000 beds, there is but little correlation between Poor-law, isolation, voluntary, or special diseases hospitals. Yet in each district there should be close association under one authority between voluntary and State institutions. Though the Poor-law is now so largely medical, it is still administered on a relief basis and by bodies which are not health authorities. The factory service and the school medical service are still insufficiently connected with the local work of the sanitary authority; and above all, there is much to be done to give health insurance its rightful place as an integral factor in preventive medicine.

The great triumphs of public health work in the last century were for the most part won in the field of environmental hygiene and it must always remain our foundation. With the new century, however, there came a remarkable development. A direct frontal attack was made upon tuberculosis, a comprehensive system of school hygiene was introduced and rapidly developed, maternity and child welfare work was widely undertaken, the new knowledge of the diagnosis and treatment of venereal disease was applied gratuitously for the alleviation of sufferers all over the country, and by the establishment of the insurance medical service the State made the family doctor an integral part of our system of public health administration. It may well be that from a public health point of view it would have been more convenient if Poor-law reform had preceded the establishment of national health insurance, and if the latter had been anchored in a reorganised sanitary authority closely associated with clinics and hospital institutions. But there it is: in Britain we are not deductive philosophers, and we proceed, from precedent to precedent, "to take occasion by the hand." The fundamental fact and common ground is this, that we have in Great Britain 15,000 insurance practitioners who have entered the service of the State to care for the health of upwards of 14,000,000 insured persons in the interest of preventive medicine in its broadest meaning. The reform which our forerunners desired has come to pass, the workers have ready access to the doctor at the earliest stage of disease, with the result that the medical supervision of them is actually threefold greater than before the Insurance Act was passed. There is more careful diagnosis; there is earlier treatment; there is better knowledge of the incidence and distribution of disease, and at a stage when it can be cured or prevented; there is, for the first time, a measurement of the relation between sickness and capacity to work. No doubt there are still many defects and inequalities in the administration of so novel a scheme. But the scheme is here; and it is for us all to make it work by integrating it with the other public medical services. If in every district medical practitioners and the medical officer of health will coöperate cordially an immeasurable advance will be made forthwith.

3. PUBLIC EDUCATION IN HEALTH.

The third reform which is needed seems to be proceeding apace—namely, the education of the people in hygiene. One thing is quite certain. We have reached a stage in the evolution of the public health when it is a necessity of further progress that we should create an enlightened public opinion and carry it with us. This is necessary, first, because there is need of an "impulse" behind sanitary legislation and effective administration of it, and secondly, because the public health is dependent upon personal hygiene and the day by day individual practice of the principles of preventive medicine. We must do more for ourselves.

All local authorities are indirectly engaged in educational health work in so far as they discharge effectually their statutory duties under the Public Health Acts, and this aspect of their work is exerting, as a study of the history of the past 50 years will show, a paramount influence on the community. It is, on the whole, the most effective and far-reaching form of health education. Some local authorities and many voluntary societies are undertaking supplementary educational work of a more direct nature, and under the new Public Health Bill of this year all authorities outside London are to be given definite and wide powers to develop this service. Section 67 is as follows:—

> "Any local authority or county council may arrange for the publication within their area of information on questions relating to health or disease, and for the delivery of lectures and the display of pictures in which such questions are dealt with, and may defray the whole or a portion of expenses incurred for any of the purposes of this section."

It will no doubt be necessary before long to consider whether this work should be included in the grant-earning services, and if so whether, and on what terms, voluntary societies engaged in health propaganda should be similarly assisted. As we are evidently on the brink of a widening system of popular health instruction, I may express the considered opinion that it is the local authorities who should be mainly responsible for undertaking systematic educational health work, direct as well as indirect, suitable to their own district, circumstances, and needs, with such supplementary assistance as the voluntary societies concerned may find themselves able to furnish.

It is important that information thus afforded should be appropriate, correct, and timely. Some medical knowledge should be imparted, some knowledge of the ways and means of sanitary government, and much advice as to personal hygiene—but not one of these three should be overloaded. Exceptional facilities now exist, and the people should be encouraged to use them. Instruction should be given as to the effect of social habits and conditions on health, and *that it is won by a way of life* rather than a bottle of medicine. Above all, we must all learn to think of public health, not only in terms of the individual, the home or the parish, but nationally, Imperially, and even internationally. The world is both larger and smaller than in 1875, and the capacities and opportunities of human life and endeavour have been greatly and hopefully expanded.

THE

Croonian Lectures

ON SOME

DISORDERS OF MOTILITY AND OF MUSCLE TONE,

WITH SPECIAL REFERENCE TO THE CORPUS STRIATUM.

Delivered before the Royal College of Physicians of London

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LECTURE III.*

PLASTICITY: "LENGTHENING AND SHORTENING" REACTION.

MR. PRESIDENT AND GENTLEMEN,—The proof of the existence of the property of plasticity in muscle tone we owe to the investigations of Sherrington, who in his work on experimental decerebrate rigidity discovered that the limb of the animal, when passively flexed, say at the knee, would retain that posture, the stretched quadriceps adapting itself to the new position of the limb and holding it so ("lengthening" reaction); conversely, if the latter was again extended, the quadriceps naturally shortened, yet again contributed its quota to maintenance of the fresh attitude ("shortening" reaction). We note that in Sherrington's view this quality belongs to tone as derived entirely from somatic proprioceptive arcs, and that it is demonstrated only in pathological (decerebrate) states, in which one need scarcely say various efferent paths *both* from the cortex *and* the basal ganglia are completely out of action.

In the course of my study of striatal cases much attention has been directed to the question of plasticity, and *the general conclusion is, that this quality of muscle tone is not specially in evidence in these diseases.* Parkinsonian limbs, passively compelled to assume a certain posture, reveal no particular tendency to maintenance of the new position. On the contrary, when left to themselves they tend to return forthwith to the Parkinsonian attitude from which they have been disturbed, that is, if the case is of average severity. A patient told me spontaneously of his frequent observation when in bed that on his extending his arms outside the bedclothes they always came back insensibly to a position near the upper part of his chest. This return to previous attitude is easily observable in the case of the hand and fingers; passive extension of the fingers is not succeeded by maintenance of the extended posture, even for as short a time as a second or two, whereas in decerebrate preparations the fresh posture is held almost indefinitely.

The feature of maintenance of different postures passively imposed on a limb is characteristic of the clinical state known as catatonia, and is not in itself dependent on the presence of extremes of rigidity. Catatonia is seen in a considerable number of morbid clinical conditions, diverse in nature but alike in that cortical function is disordered. For example, it is often noticed in the acute stages of epidemic encephalitis, it is a pronounced feature of various psychoses, of certain cases of hysteria, and so on. In respect of outward character, the "lengthening and shortening" reaction of a decerebrate limb does not differ from that seen in any of the above-mentioned morbid states, in which, precisely, the limb muscles, in virtue of plasticity, hold it in any posture passively impressed on it. The argument is not vitiated by any claim that in these cortical and "psychical" conditions the action of "volition" is not excluded, for investigation will prove the claim to be unfounded. Now in my experience no clinical state resembling catatonia, even if merely in *external* characters, occurs in ordinary cases belonging to the striatal group. Applying the usual clinical tests, the observer finds little evidence of the occurrence of any reaction to be appropriately described as a "lengthening and shortening" reaction, such as Walshe, for instance, has had occasion to note in a case of decerebrate rigidity in man, and Royle, in spastic paraplegia of cortical origin (gunshot wound). I cannot therefore give any support to the view of Hunter, as expressed in his latest articles, that "a tendency for fixation of the muscle at any length passively imposed upon it" is a special characteristic of Parkinsonian rigidity. On the contrary, the cases in which it has come under my notice have been definitely extrastriatal. In view of its interest, allusion may be made to a case of my own.

The patient was an elderly man who was admitted to hospital in a semi-conscious state, with a history of having had a "stroke" 24 hours previously. On examination the right arm was seen to be in a state of "early rigidity" and in moderate flexion; the right leg was similarly rigid and extended. Aphasia was prominently in the foreground of the clinical picture. The man frequently passed his left arm over his head or moved it spontaneously about the bed, whereas the right limbs exhibited no such movements. The deep reflexes were more active on the right than on the left; the plantars were both in reduced flexion, and a crossed plantar in flexion was constantly obtained from the right sole, but never vice versâ.

It was remarked at once on testing that the right limbs (arm and leg) exhibited the "lengthening and shortening" reaction in a pronounced form; as a single illustration, when the patient was put on his left side, the right lower extremity was passively abducted at the hip and flexed to a right angle at the knee, and this new (and awkward) posture was maintained for three minutes by the watch. The leg was then extended at the knee, and the quadriceps group at once maintained the extension again. The left limbs showed a similar reaction in a less noticeable degree; it was usually and more or less immediately interrupted by the "spontaneous" movements already alluded to.

On the second day the patient had two typical Jacksonian fits on the right side, beginning with twitching of the right arm, and both of these spread in moderate degree to the "second side." A diagnosis of cortical (submeningeal) hæmorrhage over the left frontoparietal region was made and this was corroborated by subsequent examination.

A case of this kind confirms the general statement made above, to the effect that the type of clinical case most likely to furnish proof of the existence of plasticity as a quality or property of muscle tone is one in which pyramidal function is disordered from the cortical side.

Passing reference may at this point be allowed to the experimental evidence on which Hunter partly relies for support of his views. In the domestic fowl and the seagull he removed the corpus striatum on one side and obtained a diffuse muscular rigidity, which he says "is remarkably similar to Parkinsonian rigidity in man. Its diffuseness, resistance to stretching, and the tendency for fixation of the muscle at any length passively imposed on it, are common to the two conditions." Now it may be fairly argued that the bird is not a suitable animal for experiments on the corpus striatum from which deductions are to be drawn as to striatal function *in man*, for the plain reason that it has practically no cerebral hemisphere beyond the corpus striatum; its pallium is electrically inexcitable; it has no pyramidal tracts in the ordinary sense; in its tractus striomesencephalicus (spared by the operator) mingle fibres both of striate origin and from the minute extrastriate pallium. The differences between it and

* Lectures I. and II. appeared in THE LANCET of July 4th and 11th respectively.

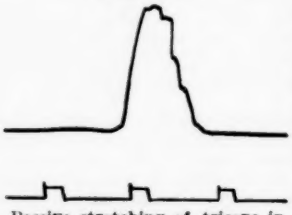
the mammalian brain are great enough to render comparisons as to function more than usually precarious. (The data are more specifically examined in a paper on an "Experimental Research into the Anatomy and Physiology of the Corpus Striatum," published in 1914.)

Since in the sense employed by Sherrington the reaction of plastic tone is a property of ordinary somatic proprioceptive tone, and since hypertonia characterises paralysis agitans and the other diseases at present under discussion, we might expect to be able to demonstrate at least minor degrees of the "lengthening and shortening" reaction in these affections. The well-recognised distinctions, however, between pyramidal and extrapyramidal cases must be borne in mind; prominent here is the fact that nothing like the same diminution of "voluntary" innervation obtains in the latter as in the former. Speaking generally, the subject of paralysis agitans is capable of innervating his musculature to an extent impossible in the patient whose corticospinal tract or tracts are anatomically or physiologically interrupted, and for this reason, as I consider, the lesions in his case cannot produce the pathological conditions essential for the visible demonstration of the phenomena of plasticity in any marked degree. In other words, the more serious the interruption of the pyramidal system, the more easily is this particular tone reaction excited; and it is seen at its maximum when that system is completely in abeyance, as in decerebration.

THE "COGWHEEL" PHENOMENON.

We may now consider whether the "cogwheel" symptom of Camillo Negro (1901) is connected with the reaction in question, and whether it may be regarded as a minor degree of the "lengthening and shortening" sign. When a hypertonic muscle is passively stretched it resists; and this resistance often takes the form of an irregular jerkiness, as though the muscle were being pulled out over a ratchet arrangement; it is momentarily checked and extended in a little alternating series of two, three, or more phases, hence the expression imagined by Negro. If the passive stretching is quick the phenomenon is usually more readily appreciated by the examiner. (Cf. Figs. 21 and 22.) It is not found in the opposite muscle that is being simultaneously shortened; on active ("voluntary") movement it may be remarked both in the contracting and the relaxing muscles, but, I find, to a less extent than in the case of passive movement.

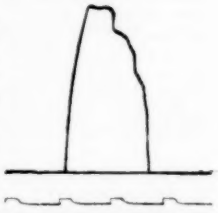
FIG. 22.



Passive stretching of triceps in a case of paralysis agitans. "Cogwheel" sign.

Various and very different explanations have been forthcoming. Santos, for instance, an exponent of the dual theory of muscle tone, ascribes it to a clonus of the parasympathetically innervated part of muscle, but if Hunter's opinion that this part is compact of non-contractile fibres be adopted it is at once obvious these cannot of themselves be the seat of any such movement, for *ex hypothesi* they are only passively moved with the contracting fibres. Bing, who remarks that this view does not account for the occurrence of a degree of the "cogwheel" sign in active movement, seeks to explain it as a disturbance of reciprocal innervation, a release-phenomenon "produced by failure of a subcortical mechanism which ensures continuity of decontraction." It is simpler, I consider, to regard it as one of the expressions of hyperactivity on the part of somatic proprioceptive arcs. When a muscle already in contraction (hypertonia) is abruptly stretched its end-organs are stimulated and the reflex contraction promptly reinforced, thus offering a momentary increase of resistance, felt as a sort of "catch" in the passive extension; the moment this "catch" takes place there is an immediate tendency for fixation at that point, for the muscle, being in a condition of postural overtone, will exhibit this tendency whenever it is momentarily "pulled up" (movement being the process of changing from one posture to another). In its turn the "catch" is overcome by the examiner's effort and the stretching causes a second excitation of the arc, hence again the process is gone through. If a muscle, however hypertonic, is slowly pulled out the phenomenon is so faint as to be negligible. In a sense, therefore, the "cogwheel" phenomenon may be regarded as a minor form of the "lengthening and shortening" reaction. It is not, however, confined to Parkinsonian and similar cases, though naturally more readily there demonstrable because the muscle can in fact be stretched; in severe hemiplegic cases the rigidity may not be overcome by stretching, but when it can be the observer is sometimes conscious of a mild "cogwheel" movement. Its appearance in the course of active or "voluntary" movement of a rigid motor unit (in protagonists and antagonists) is less noticeable than during passive movement; I have not been able to satisfy myself that it is much in evidence in "voluntary" shortening, but it may be occasionally felt in "voluntary" lengthening in Parkinsonian cases (Fig. 23), where the explanation cannot be essentially dissimilar. If denervation or decontraction is not prompt enough the transient check brings about the same result because of the hypertonia.

FIG. 23.



"Voluntary" lengthening of biceps in a case of post-encephalitic Parkinsonism. Slight "cogwheel" phenomenon.

STRIATAL ATTITUDE.

So familiar and definite are the attitudes adopted in average cases of Parkinsonism (of whatever origin) and of progressive lenticular degeneration that no detailed account is required. Parkinsonian patients, young or old, all look like each other, mainly if not solely because of the "involuntary" assumption of more or less identical postures, which are at least as specific as those of hemiplegia. The attitude is one of generalised flexion, as a rule; the lower extremities are as it were folded in moderate flexion at ankle, knee, and hip; the trunk is flexed in a concave anterior curve; the head is commonly flexed; the upper limbs are semiflexed at the elbows. At the wrists, however, extension ordinarily occurs, with flexion at the metacarpo-phalangeal and usually also at the interphalangeal joints. Very occasionally, as is not well enough known, a type of Parkinsonism with extension of head and trunk is met with.

Posture or attitude cannot be considered apart from tone-effecting mechanisms. Tone is posture; that is to say, in toneless limbs no particular posture can develop, except as caused by extrinsic agencies—e.g., gravity. Limbs whose musculature is in tone (reflex contraction) assume postures capable in the normal person of being modified instanter at the bidding of "volition," whereas in disease (pyramidal and extrapyramidal) tone-postures are a sequel to release from the control of superior, tone-controlling centres. The postural scheme of the hemiplegic is no haphazard thing; a predilection type or pattern exists, possible explanations of which have been examined in my paper on "The Old Motor System and the New." In decerebration, analogously, a selective incidence of tone on the antigravity muscles takes place. These specific postures can only be assumed if at the same time the inflow of tone to antagonistic groups is relatively lessened by reflex

inhibition. In the case of hemiplegia, tone influx is divided; in the arm, the flexor groups are hypertonic, in the leg the extensors. It is interesting and no less important to note that in each instance the groups with lessened tone are the weak muscles (e.g., the flexors, in the leg). From what has already been said of the blending of tone with muscular contractions otherwise evoked this can be readily appreciated.

Now in the case of Parkinsonian posture the circumstances differ somewhat; there is not the same "schizotonia" (to borrow a useful term recently coined by Dusser de Barenne) as in pyramidal and decerebrate conditions. The feature of paralysis agitans and kindred morbid states, from this standpoint, is the apparently indifferent or diffuse distribution of the hypertonia, as has been made the subject of allusion already. But if the increase of tone were strictly equal in each and every skeletal group of prime movers and antagonists, I do not see why resumption of postures as definite and specific as the Parkinsonian should take place after they are passively or actively disturbed. We are forced to the conclusion that, general hypertonia notwithstanding, it preponderates in flexor as opposed to extensor muscles; more precisely, in those groups (already specified) whose contraction underlies the maintenance of Parkinsonian attitudes.

On examination these muscles are seen to be firm, to have shape, and to be outlined in contraction with a distinctness as manifest as in hemiplegic groups associated with posture, and I cannot therefore agree with Hunter that in Parkinsonian rigidity there is no selective incidence, or with his corollary that only contractile tone (in his sense) is thus selective. Nor can I confirm his view that "the posture assumed in Parkinsonian rigidity is due to plastic tone *only* [italics mine], exhibited in agonists and antagonists." On his own hypothesis plastic tone is due to *non-contractile* fibres moved passively by contracting fibres and subsequently held thus in posture, hence the latter must first be in activity, and plastic tone of itself can do no more than support a tone-scheme previously and otherwise brought about. To exclude contractile tone, therefore, in so plain an attitude as the Parkinsonian seems impossible as well as unnecessary; finally, if plastic tone is exhibited *indifferently* in agonists and antagonists, the adoption of a specific posture is unexplained.

Of the specificity of Parkinsonian attitude there can be, in my opinion, no question whatever, but I can offer at present no satisfactory explanation of its type. No merely mechanical preponderance, as it were, of flexor over extensor contraction suffices. Hughlings Jackson drew contrasts between Parkinsonian and cerebellar attitudes, and I have myself endeavoured in other communications to seek a solution. Possibly weight should be laid on the contrast between the relative incidence of tone in decerebrate cases on the extensor or antigravity musculature ("reflex standing"), and in paralysis agitans on the flexor musculature. But the "meaning" of the latter posture is obscure. In any case, as I have argued elsewhere, the tone-picture of Parkinsonism is absolutely distinct from that of double hemiplegia; yet in decerebrate cases that of the latter is more closely approached than the tone-picture of the former, although the corpus striatum is just as completely out of action. The inferences to be drawn from these data are discussed at some length in my paper on "The Old Motor System and the New."

"FIXATION-CONTRACTION."

Much attention has been devoted, more especially by continental workers, to the question of the occurrence of what is called "fixation-contraction" in cases of striatal disease. The term is not familiar to English neurologists, but the condition has long been known under the name of "Westphal's paradoxical contraction," and consists typically of an involuntary (reflex) contraction of a muscle, of a slow and tonic character, when its ends are passively approximated as closely as is practicable. In suitable instances it can be demonstrated in the tibialis anticus muscle by firm passive dorsiflexion of the foot, and this "tibialis phenomenon" was obtained years ago by Oppenheim in cases of paralysis agitans. In 1906 Foerster stated that "fixation-contraction" can be seen in *all* the muscles in that disease, as well as in cases of arterio-sclerotic muscular rigidity. It has been called "fixation-rigidity" by Strümpell. Jakob, also, attributes considerable importance to the phenomenon.

In routine examination of numerous examples of the various morbid affections that at present concern us special attention has been given to "fixation-contraction," following the technique of Foerster, who says the passive movement (of shortening) has to be made with a certain jerk and the limb segment pressed firmly to the end-position, the head of the bone concerned being pushed well into its socket, and the new position held passively for an appreciable moment. When this technique is prosecuted the muscle passively shortened exhibits a tonic contraction analogous to the "shortening reaction" already investigated as a property of somatic proprioceptive tone.

As a result of tests directed to this matter I have come to the conclusion that *while "fixation-contraction" can be demonstrated in a fair number of cases it is neither universal in the musculature nor by any means so pronounced* as Foerster would have it. In various typical cases of Parkinsonism I have failed to satisfy myself of its presence except in minor degree, and not seldom, indeed, is it negligible. A further conclusion is, that *it is no more than a manifestation of increased somatic proprioceptive tone and as such is not deserving of a special terminology.*

To investigate its occurrence a number of cases of well-marked unilateral Parkinsonism were selected and the condition on one side compared minutely with that of the other. The tibialis phenomenon was made the subject of special examination; another convenient test is to approximate the origin and insertion of the deltoid by passive lifting and supporting of the arm in the vertical position. Many other muscles, however, were also utilised. To convince oneself of the presence or absence of "fixation-contraction" the muscle in question was examined with the eye, was palpated with the finger (an assistant performing the passive movement), and, if it so happened that the action of gravity came into play when the limb segment was deprived of this passive support, the time taken to fall was estimated on the two sides respectively. Speaking generally, no pronounced or persistent tonic contraction in the approximated state was observed in any particular muscle—at the most, as already stated, only moderate or minor degrees of the condition could be found.

In no case have I or my assistants been convinced of the development by this method of a muscular state that can fairly be represented as belonging to the category of catatonia (or catalepsy, as both Jakob and Foerster term it, though use of the word in this connexion should be avoided). If the foot takes longer to drop through gravity on the affected than on the normal side, if as the arm falls from the vertical an evident "catch" is demonstrable just as the movement begins, this is no more than what is to be expected in a hypertonic muscle or muscle group, and cannot be thought to constitute *per se* a pathognomonic sign of extrapyramidal rigidity. There is truth in the argument of Mayer, that in some instances at least "fixation-contraction" is nothing else than a stretching contraction, such as has been already illustrated in the previous section. Even in well-marked examples of Parkinsonian rigidity, when passive shortening of a given muscle (as when the flexed lower extremity is extended to an angle, say, of 135° at the knee, the quadriceps being thereby shortened) is made, but the extreme position not attained, it is not my experience that the limb is thus held immobile by the development

of a "fixation-contraction," or, even so, I cannot assent to the interpretation put on this by the observers mentioned. At the most, it is identical with a phase of the "lengthening and shortening reaction," a property of proprioceptive tone, and merits neither separate description nor explanation.

When, therefore, Jakob maintains that the phenomenon of "fixation-contraction" is responsible for "cataleptic" (catatonic) symptoms in Parkinsonism, for the development of contractures, for adiadochokinesis and the various "pulsions," the impeding of voluntary movement, the slowing of movement at its commencement, and the interruption of movements in series, all this in my view is tantamount merely to the fact that hypertonia (exaggerated reflex contraction) of the musculature interferes with the prosecution of normal muscular action.

THE LORE OF THE ANTAGONISTS, AND THEIR RÔLE IN DISEASE OF THE CORPUS STRIATUM.

I have left to the end of my necessarily somewhat long analysis of movement and tone the *quæstio vexata* of the nature of the part played by the antagonists in normal "voluntary" motion, and the correlative problem, whether in the motor symptoms of striatal affections any, and if so, which, are to be ascribed to disordered function of this component of movement.

In his Croonian lectures before this College (1903) the late Dr. Charles Beevor summarised the two divergent theories then in vogue as to antagonistic function: (1) According to Winslow (1756) and Duchenne (1867) the antagonists take part in all "voluntary" movements, their function being to moderate (check, control) the contraction of the prime movers or protagonists, for the sake of precision of movement. Demeny (1890) drew a distinction between resisted and non-resisted "voluntary" movements; in the case of the former, the antagonists relax; in the case of the latter, they are in action during the primary movement. (2) According to Sherrington, when contraction of the principal muscles taking part in a given movement is effected by cortical (electrical) stimulation there is both relaxation and inhibition of the tone of the antagonists of this movement. Even with minimal excitation of the motor cortex relaxation of the antagonists is still obtained. From his own clinical observations Beevor concluded that in strong movements against resistance the antagonists are always relaxed, and that in unopposed movements (gravity being excluded) relaxation is the rule. In support of this second conclusion my old chief instanced the fact of the absence of demonstrable contraction in the left (say) sternomastoid when the right sternomastoid is the prime mover, as in rotation of the head to the left. Repeating this test a number of times, I am able to confirm its accuracy, but we must remember that the left posterior rotators come into action in head rotation to the left *before* the right sternomastoid does—the latter not contracting till the head is well past the mid-line—that they therefore are prime movers in the act, and, accordingly, the antagonists to the movement are constituted by the right posterior rotators. If these are examined it will, I think, be found that they do not absolutely relax, but decontract in moderating the desired movement. It is doubtful, therefore, whether the sternomastoid illustration really justifies the deduction drawn by Beevor from it.

Needless confusion has arisen from failure to appreciate the exact meaning of "relaxation" of an antagonistic group when protagonists contract. This has been taken erroneously to imply constant, complete, and immediate relaxation, whereas the words of Sherrington are that the contraction of the one muscle rises as that of the other falls, and the rise of the one keeps sufficiently close step with the fall of the other. No primary conflict between the two theories exists, nor any insurmountable difference. Amplification, however, is desirable.

To get a clear idea of antagonistic function we must bear in mind the *essential variability of antagonistic rôles*. Any stereotyped notion of antagonists being somehow "opponents" is fatal to clear thinking. We may speak of the antagonists *in* a movement, but never *to* a movement. "Opposite" muscles are not *ipso facto* "opposing" muscles. Their function ranges from (1) active coöperation in a movement, so that it is indistinguishable from that of prime movers, (2) through harmonious decontraction, as in ordinary displacements of a joint, to (3) a relaxation as quick and complete as possible, when the prime movers are acting powerfully against resistance. In illustration of this latter function, let the observer extend his arm laterally to a point well above the horizontal level at the shoulder, the deltoid being in full protagonistic action. In this position let him place his hand on a convenient shelf or ledge and make strong downward movement of the extended arm against this resistance. No displacement is possible, but the deltoid, now the antagonist in the required movement, immediately and with remarkable completeness can be felt under the fingers to soften and relax. There is here no moderating function, since no displacement as a fact occurs. In illustration of the first-mentioned function, I may cite the "straight left" of the boxer, when, accurately speaking, protagonists and antagonists as usually understood are in active coöperation, there being again no joint displacement. Beevor's illustration of the conversion of the leg similarly into a rigid muscular pillar, as when skating on the "outside edge," is equally apposite.

As I conceive it, recognition of this variability in antagonistic action will explain what might otherwise appear mutually discordant phenomena. At any moment in the course of a voluntary movement the character of antagonistic coöperation may alter according to requirements; it may change from decontraction to synergic coöperation, or again to relaxation, as the prime movers pass from kinetic to static action, or encounter resistance, and so forth. Differing modalities of function in the antagonists correspond to variations in protagonistic action. No haphazard or indiscriminate correlation, however, exists between the two; on the contrary, all is in strict physiological harmony.

As is known, the relationship of agonist contraction with simultaneous antagonist decontraction in ordinary joint displacements was described by Sherrington as "reciprocal innervation," and this "law" has received unqualified acceptance ever since its enunciation. That any conflict of the "pull-devil-pull-baker" kind should exist as between, say, flexor and extensor groups during displacement at the elbow in the direction, say, of flexion, is, in fact, both clinically and physiologically, unthinkable. He also, however, has demonstrated the occurrence and explained the nature of what he calls "double reciprocal innervation," a physiological state in which the centres for both prime movers and antagonists may discharge together, though unequally. In this way Sherrington covers the cases both of increase of protagonistic contraction with diminution of antagonistic contraction, and of simultaneous contraction (or, of reversion into rest) of the two groups.

These lectures were nearly completed when a communication by Prof. Frederick Tilney and Dr. Frank H. Pike was published in America. These investigators, experimenting on cats and monkeys, say, in so many words, that "under normal conditions we have not observed the contraction-relaxation phenomenon which is generally known as Sherrington's 'reciprocal innervation.' This phenomenon, although also observed by Beaunis in rare instances, was deemed by him both exceptional and inexplicable." Their view is that in all voluntary movements synchronous "co-contraction" takes place in the antagonists: they speak of "synergic units" composed of both flexors and extensors, and so on, and in each "synergic unit" there is a "dominant"

element (the prime movers) and a "check" element (the antagonists). During action each exhibits "a proportional mutual increment of tension," which in the case of the former is "uniformly greater" than in the case of the latter. There are also differences in the "times" when this increment of tension comes into action in the two respectively. I cannot in this place attempt any examination of their researches as these may bear on the problem before us, but I may allow myself one comment. These workers do not appear, on the clinical side, to have envisaged all the possibilities of antagonistic action, since no investigation, seemingly, either of "voluntary" movement against strong resistance, or of antagonistic coöperation, has been made. The experimental side of their research undoubtedly seems to conflict on the face of it with Sherringtonian conceptions based also on experimental methods, but all that need now be said is that I do not think there is so complete a disparity as might at first appear between some (at least) of their findings, and the usual clinical interpretation of the rôles played by muscular components in individual "voluntary" movements. With the strictures passed by Tilney and Pike, Golla and Hettwer, and others, on the imperfections of ordinary clinical methods, I am in partial agreement, but I do not admit that comparisons between cases all of which are submitted to the *same* technique of examination are illegitimate or uninformative, or that clinical investigation is to be renounced in favour of electromyographic technique. Indeed, Tilney and Pike enter a word of caution against basing conclusions solely on records obtained in this way.

Relying, then, on well-tried clinical procedures and their application in the clinical study of striatal disease, *my conclusion is that in these affections the general laws of antagonistic action, as above illustrated, hold good.* From the records of Parkinsonian cases reproduced in Figs. 15, 16, and 18, contraction and decontraction can be demonstrated just as in normal individuals. No departure from normal states of diagnostic significance has been discovered. No "defective inhibition of antagonists," that is, no marked retardation, or failure, in making a particular movement on request through inability to relax the existing tension in an antagonistic muscle, has been noted, still less any instance of the antagonists coming into action *before* the prime movers, as we shall see occurs in other pathological conditions to receive attention. The Parkinsonian can employ his antagonists in coöperation, and, conversely, they can be shown to slacken when the occasion demands it, according to normal physiological precedent.

I find, of course, as has been already outlined, an impediment to quick alternating movements of a limb-segment in the existing hypertonia of both of two opposite groups. It must be obvious even to superficial observation that the fingers cannot be separated ("spread") with facility or quickness by one set of interossei if the reflex tonic contraction (hypertonia) of the opposite set cannot be inhibited with facility either. For while "volition" *adds* a contractile element to a muscle already in "involuntary" contraction, in the sense that the two blend, its action in the antagonistic component, also in "involuntary" contraction, should be to allow the latter to elongate and yet to maintain in elongation a moderating influence requisite for the particular end to be served. Admitting antagonistic activity in joint displacement, and not a mere passive or mechanical stretching of a relaxed muscle, the truth remains that this activity of innervation, this "increment of tension," is occurring in a muscle that is in fact *lengthening* itself, and the question is to explain the simultaneous activity of contracting and elongating elements. Only by inhibition, as I conceive it, of a *shortening* contractile process (such as takes place in the prime movers) can a muscle actually elongate while maintaining contractile tension; that is to say, the process in the antagonists cannot be physiologically *identical* with that in the protagonists. When a muscle is hypertonic its fibres are in a condition of greater (reflex) contraction, more tension, than in a normal muscle. If it happens to be *pro tem* an antagonist, then decontraction starts as it were behind scratch, and is adversely handicapped from the outset. Avoiding the language of metaphor, I say that more decontraction has to be effected in the antagonist (by a process of what I can only regard as inhibition) before the muscle begins to elongate, than is requisite in a normal antagonist. Hence the hindrance already alluded to, an impediment traceable through all Parkinsonian action in greater or lesser degree, and one to which many of the clinical phenomena here illustrated are in part at least attributable. Hence, in part, also, the "effort" of which the Parkinsonian patient is for ever complaining. The amount of innervation required for everyday movements, familiar to him by years of experience, turns out to be insufficient for the desired purpose; and he utters the simple confession, "it is easier not to make the movements."

An important and significant corollary arises from the conclusion to which this clinical study of striatal cases has led. Having found no abrogation of agonist-antagonist activities, no material departure from normal physiological laws except in so far as existing hypertonia causes a drag on rapidity and a reduction of facility, I am led to the decision that *the normal combining of protagonist, synergic, and antagonist muscular units in a single "voluntary" movement cannot be regarded as a function of the corpus striatum.* I need not at this point enter on a discussion as to the physiological level at which this combination takes place, since it will be dealt with subsequently. Suffice it to say that since the lesions of the cases under review are in all probability destructive or degenerative processes in the corpus striatum and its efferent systems, and since, as I have just pointed out, muscular components are in normal (if sometimes hampered) action as required, the mechanisms underlying their action are definitely non-striatal. Statements such as that of Lewy, therefore, that "the slackening of the antagonists during contraction of the agonists is dependent on the corpus striatum," are without either clinical or physiological foundation.

INVOLUNTARY MOVEMENTS.

Hitherto we have been concerned with an examination of two symptom-groups in the striatal triad—viz., those relating to the "voluntary" motor system, and those of muscle tone. Attention must now be directed to the question of so-called "involuntary movements."

In order to keep our study within appropriate limits I shall deal mainly with chorea, athetosis, and tremor. At the outset the caution must be repeated, that discussion of these symptoms in the present setting is not to be taken inferentially as implying for them a striatal origin. Further, the reader may with advantage recall the general comments made in my first lecture on the subject of "voluntary" movements and on the lack of precision in the meaning of the term.

The difficulties surrounding the problem may be set out as follows: (1) the classification and differentiation of the various kinds of "involuntary" movement have not been satisfactorily determined; (2) in a given case more than one type may make its appearance; (3) the movements are in many instances complicated by alterations in muscle tone, and their dissociation, however desirable for the purpose of study, is often far from easy; (4) lesions in different parts of the nervous system have at one or other time apparently been responsible for similar types of pathological movement; (5) conversely, lesions approximately in the same area have seemingly given rise to different varieties of movement; (6) the pathological findings in a particular case may be open to diversity of interpretation; (7) the evidence furnished by experimental methods has unquestionably been in some cases negative, in others conflicting.

Preliminary Considerations.

Before proceeding to clinical analysis, we must clear the ground by one or two preliminary considerations of basal significance, neglect of which still continues to be a source of confusion.

(1) It seems almost a platitude to point out that the phenomena to be dealt with are "positive" symptoms; they are over-mobile conditions; being movements, they cannot possibly be *caused* by impairment or destruction of movement-producing mechanisms—only paralysis, or absence of movement can thus result. Involuntary movements must be set down to *activity*, not to paralysis, of some or other motor mechanism, which must be in a physiological, not a pathological state. In every case of involuntary movement the phenomena occur during the action of *healthy* nervous arrangements, and constitute, as Hughlings Jackson insisted, a problem in physiology; they represent "physiology in difficulties." It is the more imperative to make this cardinal principle clear because it has been persistently ignored or minimised by many workers, especially in continental schools. To assign tremor and choreo-athetosis to destructive lesions of the corpus striatum is not only impossible, but ridiculous; a "hole" in the corpus striatum—for that is what outfall of parenchymatous cell-fibre systems means—cannot cause any movement whatsoever. Involuntary movements are the derivative of living mechanisms, and *our problem, therefore, is not what mechanisms are paralysed, but what mechanisms are active.*

(2) As an obvious corollary, if after the development of tremor, chorea, or athetosis a destructive lesion leads to cessation of the involuntary movement, then that lesion must be so situated as to interrupt the neural mechanism that has been producing the movement. Hence the special significance of all cases in which this class of movement has permanently ceased after a destructive lesion of one kind or another. Cases of this sort, it so happens, are rare, a fact which renders their careful investigation and recording the more desirable.

(3) A third consideration bears on the question whether the symptoms are produced by irritation, or are of the nature of release-phenomena. English neurology, following the lead of Hughlings Jackson, sees many objections to the idea of the production of year-long involuntary motor activity by irritation; yet the doctrine that excessive movement is thus caused still has adherents (Bing, for instance, still describes chorea and athetosis as "Reizsymptome," arising "when a capsular hæmorrhage implicates the neighbouring basal ganglia"). To determine the exact part played by irritation in the mechanics of symptom-production is no doubt difficult; of the precise nature of the process whereby cell activity passes from a static to a kinetic stage, we are still in complete ignorance. With some show of reason, therefore, it might be held we cannot prove that the liberation of stored-up energy is *not* due to some form of stimulation or "irritation"; even with withdrawal of inhibition some stimulus might still be postulated to initiate the discharge. The argument must be based accordingly on larger grounds.

(*a*) The duration of some of the cases of involuntary movement we meet with clinically puts "irritating lesions" out of court. That "irritation" should last practically a lifetime, as in some instances of Huntington's chorea, is scarcely conceivable, aside from the fact that we are equally at a loss to figure to the mind what sort of "irritation" might thus exist and continue indefinitely. It is equally difficult to imagine "irritation" of nerve-cells giving rise to the chronic tremor of paralysis agitans, or to the athetosis of an infantile cerebral hemiplegic, which may continue without ceasing for a quarter of a century or more.

(*b*) As long ago as 1876 Jackson said, "in some cases it seems to me to be evident that contemporaneously with the loss of function of a centre there is a rise in activity of the next lower centre." This is true not merely of diseased but also of healthy states. The activities of lower centres exhibit themselves freely in the absence of control from higher centres; conversely, the latter may compel the former to suspend their duties temporarily, as is readily exemplified by the action of "volition" on the respiratory mechanism. A sentence of Hughlings Jackson's, of which so far as I am aware no particular notice has hitherto been taken, seems to me to contain a truth of much significance (to which further allusion may be made); the centres of the lower physiological levels "are considerably independent of the directive influence of the higher levels, although much under their negative (inhibitory) influence." By reference to a physiological hierarchy of this kind the phenomena of involuntary movement can be more satisfactorily explained than by any process of "irritation."

(4) An integral part of the problem before us bears on the clinical distinctions between the different kinds of movement. If, as we shall see is the case, fundamental clinical differences can be established between the types—for example, between tremor and choreo-athetosis—then the probability of their being mediated by equally different physiological mechanisms becomes a practical certainty. That the same mechanism should be at one time responsible for athetosis, at another for tremor, is unthinkable. The import of this contention will become more obvious as we proceed.

CHOREA.

In reality a symptom, chorea is the name given to more than one disease. Sydenham's chorea is ætiologically distinct from Huntington's chorea; symptomatological chorea, on the other hand, is an episodic syndrome arising in the course of or as a sequel to encephalitis, cerebral vascular disease, tumours, and so on. In the two former, and indeed, unless they are exceptional, in the latter group also, the lesions underlying the clinical symptoms are characterised by diffuseness and are *ipso facto* valueless for the drawing of exact (localising) deductions therefrom; only in the case of quite small and circumscribed vascular lesions or tumours is it at all practicable to associate the choreic symptom with the pathological finding. Again, in the choreas that bear the names of Sydenham and Huntington, symptoms of a different class are frequently in evidence. Instead, then, of endeavouring to localise choreic movements by resort to an uncertain and, for the above reasons, quite unsuitable pathology, I urge the importance of the reverse procedure; we shall learn more of the nature and localisation of chorea by a precise investigation of its clinical phenomena than in any other way.

Clinical Characters of Chorea.

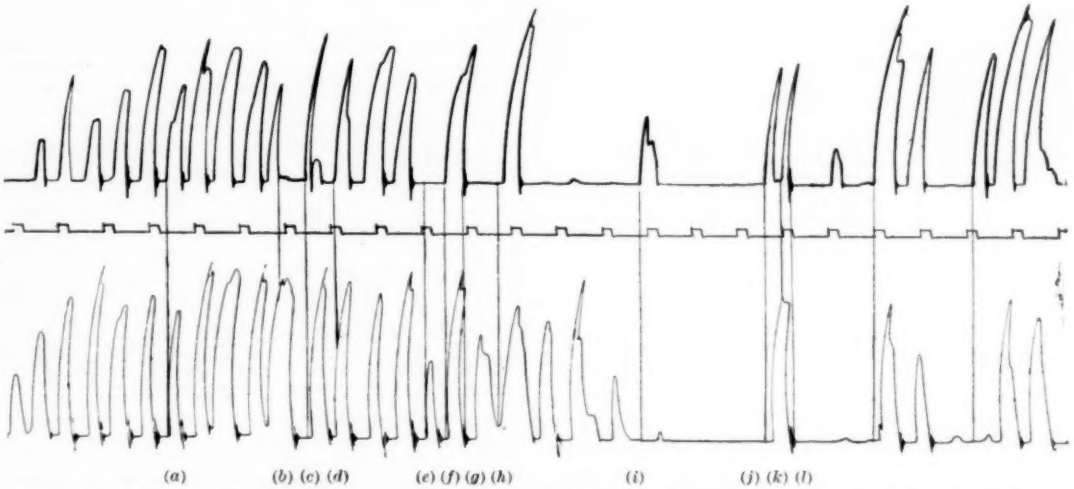
All of us can recognise a case of ordinarily well-marked chorea when we see it, difficult though the finding of an entirely satisfying definition of choreic movement may be. The following are some of the characters of this hyperkinesis:—

(1) The spontaneous movements of chorea offer an intimate resemblance to those executed at the bidding of volition. I mean thereby that they appear to be as complex (on occasion), as coördinated, and as purposeful as those of a frankly "voluntary" kind. Of their occasional or frequent elaborateness no doubt can be entertained; as a general rule, the muscular components of the movements take their specific physiological shares in synergia and sequence (to this rule there are important exceptions, as we shall shortly see); and each fresh movement appears to be directed to an end—which is never attained. Choreic motility may be described with sufficient accuracy as subjectively purposeful but objectively purposeless (cf. the difference between the German "zweckgemäss" and "zweckmässig"); in appearance only are the movements purposive, but to

describe them as purposeless without the qualification just given would be rather misleading.

Many previous writers have emphasised this general resemblance to "voluntary" movements. Hughlings Jackson (1873) said, "they are not mere spasms and cramps; they are an aimless [i.e., objectively aimless] profusion of movements of considerable complexity, much nearer the purposive movements of health." Again (1875), "the nature of the movements in chorea (a profusion of real movements—smiles, frowns, and gesticulations) is strong evidence that the part diseased serves in highly special and complex coördinations, and thus that it is a part very high up in the nervous system." Cecil Wall, to whose excellent Bradshaw lecture on Chorea, delivered before this College in 1920, I wish to draw attention, also says: "I prefer the term 'spontaneous' to 'involuntary,' not because the latter is incorrect, but because the movements, though occurring independently of the will, are of the same type as movements executed as the result of volition."

FIG. 24.



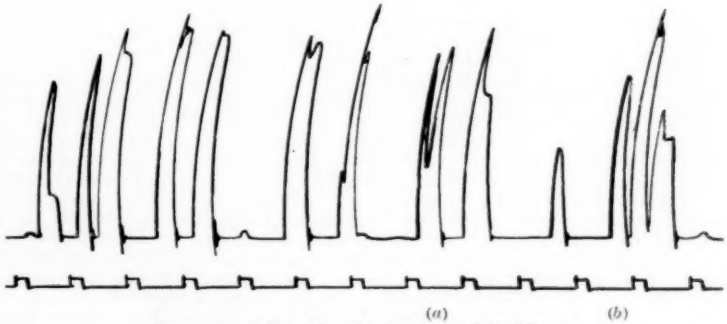
Case of senile chorea. Upper tracing gives contractions of quadriceps and lower tracing of external group of hamstrings (R. leg). Simultaneous record.

(2) A further feature is their brevity and unsustained character, their abruptness, almost explosiveness. They rise and fall, wax and wane, with a peculiar rapidity. Occasionally, and by comparison rarely, a lingering decontraction obtains; the movement comes to an end as if with reluctance. Corroboration of the correctness of clinical observation in this respect is furnished by the electromyographic researches of Stanley Cobb, who has shown the essential similarity of the action-current curves for "voluntary" and for choreic movement, the difference residing in the shortness of the choreic contractions, as a rule, and in their lack of sustainment.

Now it is of especial significance that this feature of the spontaneous movements is equally characteristic of much of the patient's "voluntary" actions. As a fact, too, long after the "involuntary" gesticulations, as such, have vanished, the choreic child will often still exhibit noteworthy abruptness of "volitional" movement. The "choreic tongue," which flies back into the mouth at the signal for release, is an example in point. The child shoots his arms out in front when asked to extend them; told to stand up, he rises from his chair with an almost amusing smartness and promptness. Walking down the ward and asked to turn round, he performs the movement with an abruptness that almost unbalances him. That one and the same clinical feature should characterise *both* "voluntary" and "involuntary" actions has an important bearing on localisation and pathogenesis, as we shall duly see.

(3) A third point in respect of choreic movements is their separateness. However rapidly they follow each other, they do not, as a rule, blend into a continuum of motor activity, as is the case with athetosis. They remain discrete, and as long as they so remain, their coördination is comparatively undisturbed. To this rule, however, there are exceptions. On occasion, one "involuntary" movement has not ceased before its successor develops, and when coalescence of this kind occurs the clinical result is a medley of "spontaneous" muscular activity not to be distinguished in any essential particular from that of athetosis. I have had for long under my care an aggravated case of senile chorea (largely right-sided) in an old lady of over 80, from whom the records reproduced in Figs. 24, 25, and 26 have been obtained. With the slow-motion camera the *apparently* purposeful and coördinated nature of the never-ceasing large

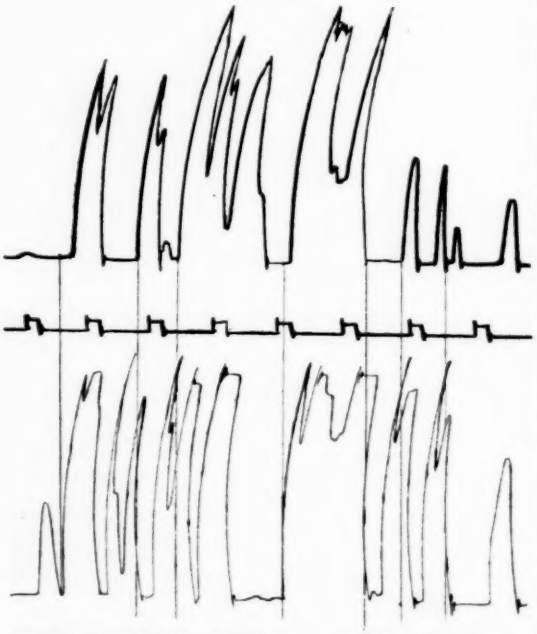
FIG. 25.



Same case as Fig. 24. Contractions of R. biceps.

and irregular movements is seen; if, however, the arm or the leg is so fixed as to minimise displacement, it is easy to convince oneself that movement follows movement in a confused, blended, and erratic fashion, and that the physiological laws governing the action and timing of the ordinary muscular components of coördinated movement are in complete abeyance. In a word, *Sherrington's law of reciprocal innervation no longer holds, disease having led to its negation.* For instance, attention is directed to Fig. 24, which gives a simultaneous tracing of the quadriceps (above) and the external group of hamstrings (below) of the right leg. Between (*a*) and (*b*) are five contractions of the extensors to four and a half contractions of the flexors, the opposite muscles contracting with practical simultaneity; the extensor contraction immediately after (*c*) is about twice as rapid as the flexor contraction after (*c*), though of practically

FIG. 26.



Same case as Fig. 24. Simultaneous records of contractions of R. biceps (above) and R. triceps (below).

the same extent; between (*f*) and (*g*) are simultaneous flexor and extensor innervations; between (*g*) and (*h*) the flexors alone contract, then at (*h*) both groups contract together, but flexor activity continues while extensor ceases; between (*j*) and (*l*) are two extensor innervations to one flexor, while at (*k*) the former commences at the very summit of existing contraction of the antagonists, yet the two end their decontraction together. Thus all sorts of pathological combinations of agonist-antagonist activity are exemplified in the record. Fig. 25 is from a tracing of the right biceps of the same case, and shows not only the complete irregularity in time and extent of the individual contractions of the muscle, but also (at (*a*)) how a second contraction supervenes on a first, before the latter has ceased. At (*b*), again, three contractions of the muscle follow on each other without a single break. In Fig. 26 are seen the contractions of the right biceps and triceps of the same case, and by comparing these as they occur between the various ordinates drawn on the record the dissolution of physiological "give-and-take" can at once be recognised. No clearer demonstration than that furnished by these and similar records of mine, of the *complete interruption of normal physiological reciprocal innervation during confluent choreic activity*, could be found.

(4) This interference with the action of the normal components of a movement producing joint displacement is not, as a rule, to be discovered except in what I call "confluent chorea." Years ago, however, the late Dr. Beevor drew attention to the occasional occurrence in acute chorea of what he termed the "paradoxical contraction of the abdomen." In ordinary normal coördination the diaphragm descends during deep inspiration and at the same time the recti abdominis slacken; the upper part of the abdomen is seen to come forward, or, if the subject is recumbent, to rise, with descent of the viscera associated with the diaphragmatic contraction. Now sighing inspiratory movements are fairly frequent in severe choreas, and on occasion, with inspiration, the abdominal muscles can be clearly observed to contract paradoxically, rendering the upper abdomen concave instead of, as normally, convex. Here is a definite clinical instance of lack of harmony between the constituent muscular units of a choreic movement, and of abrogation of physiological sequence.

I have studied several cases of Huntington's chorea from the standpoint of normal muscular action, using for the purpose the scheme previously described. Interruption of the normal interplay of constituent muscles is but rarely found, though when it occurs it is definite enough. For example, I have seen dissociation of the normal elevation of the eyebrows with upward deviation of the eyes, also of head extension in depression of the lower jaw against resistance. With the patient recumbent, I have seen disturbance of the normal sequence of sternomastoid, recti abdominis, and rectus femoris action in the movement of rising to a sitting position.

Both in "involuntary" and in "voluntary" movement, therefore, in the case of chorea, proof of the not infrequent interruption of physiological law in the performance of movements requiring harmonious coördination of prime movers, synergists, and antagonists, as well as in those which I have called movements of sequence, has been obtained.

The "Choreic Hand" and its Relation to "Physiological Shift."

(5) The earliest reference I have been able to find to the "choreic hand" (though not with this specific term applied to it) is in the volume by Francis Warner entitled "Physical Expression" (1885). It is constituted by flexion at the wrist and hyperextension at the metacarpo-phalangeal joints, the phalanges being straight or moderately over-extended (or very slightly flexed), the fingers usually rather separated, and the thumb rather over-extended and abducted. Warner found this attitude (to which he gave the name of the "nervous hand") *inter alios* among "those convalescent from chorea," and he also stated: "It is also often seen on one side only, especially in children convalescent from hemichorea." I have, myself, for years given attention to the choreic hand and have remarked its presence in an extremely high percentage of cases; it may persist, like the abruptness of "voluntary" movement already alluded to, long after "spontaneous" choreic movement has ceased. Without exception it will be found to be more pronounced on the side (if there be such) on which the spontaneous movements are (or have been) the more frequent. Its occurrence, therefore, must be linked with the mechanism or mechanisms implicated in the mediation of these movements.

Now, while the posture of the choreic hand may be adopted momentarily in the course of a "spontaneous" choreic movement, this is undoubtedly somewhat rare; to demonstrate it most easily the patient is asked to extend his arms in front of him. The hands then assume the posture of wrist flexion and metacarpo-phalangeal extension, often in a strikingly exaggerated form. When a normal individual is requested to hold out his hands a difference is usually noticeable according as the movement

is made energetically or gently; in the latter case they are seen to fall into a posture of moderate extension at the wrist with probably slight flexion of the fingers; in the former the fingers will be rather more extended, though the wrists will probably be extended, as before. The adoption of the choreic hand by the patient, however, is by no means merely an expression of the energetic abruptness of the "voluntary" movement, for it is readily obtained in numerous instances where the movement is not so characterised.

The choreic postural hand, as a moment's consideration shows, is the exact reverse, the "corresponding opposite," of that posture of the hand which is seen in everyone as the arms depend in rest by the side, or, for that matter, in any easy resting position—viz., extension of the wrist and flexion of the fingers—the expression of activity of the normal synergic muscles for grasping. The extensors of the wrist are the normal synergists to the protagonistic long flexors of the fingers and their physiological association is intimate, constant, and incessant. Now, as anyone can at once discover for himself, it actually requires a conscious effort to assume the choreic attitude "voluntarily," and the more pronounced the attitude the more is he aware of strain and effort in making and maintaining it. One reason, doubtless, for this feeling resides in the infrequency, indeed, the rarity, of any "voluntary" movement or posture of this particular sort. Yet this is the precise posture effected by a disordered condition of the neural centres and mechanisms concerned. That is to say, in the case of the choreic hand there is an "involuntary" (for though occurring in the course of a "voluntary" movement it is certainly not assumed consciously by the patient) adoption of a posture the exact opposite of that constantly seen in normal persons in a resting state, and of that ordinarily found in the hand when the arm is held out; in other words, *a "physiological shift" occurs from one posture to its corresponding opposite.* When the sole of the foot is stimulated in the normal individual a movement of plantar flexion takes place; in states of pathological function of the pyramidal system a similar cutaneous stimulus, applied in a similar place, gives rise to a movement of plantar extension—there is a physiological "shift" from one movement to its opposite. This provides us with an indirect but none the less valuable analogy by which to endeavour to explain the choreic phenomenon, and one of wide applicability, though I cannot enlarge on it further at present. The demonstration of this physiological "shift" in the case of chorea can fairly be taken to argue a condition of abnormal function of the corticospinal system, though with the immediate proviso that this abnormal state need neither be of a structural sort nor have its ultimate origin on the motor or effector side.

The Pronator Sign.

(6) Other "little signs" in chorea are indicative of a condition of disordered corticospinal function. In unilateral instances Babinski's "rising sign," described by him for cases of hemiplegia, is often obtainable on the affected side. Occasionally an extensor plantar response is found in chorea; I have seen it more than once but do not stress the point unduly. Much more frequent is the so-called "pronator sign," the arm assuming the same position of pronation or semi-pronation at the elbow as is seen in hemiplegia. When the choreic holds out his arms the thumbs are often seen to "dip" more than normally, indicative of some forearm pronation; a better way is to have the patient extend his arms above his head, when the palms are observed to turn outwards, sometimes to a pronounced degree, thus revealing an "involuntary" over-pronation at the elbow. In a paper on decerebrate rigidity in man allusion has already been made to some of these phenomena and the suggestion put forward that choreic postures—the choreic hand, the pronator sign—are *pro tanto* indicative of the partial release from "voluntary" control of mechanisms that are wholly released in complete decerebrate rigidity. The suggestion has been quite misunderstood in certain quarters, but from what has been outlined above it will be seen to indicate simply the fact that certain analogies obtain between the results of release of function in chorea and of release in disorder, *inter alia*, of the corticospinal system. In a recent communication I have argued from clinical data that the results of complete single release (hemiplegia, paraplegia) are not identical with those of complete double release (decerebrate rigidity—cortical efferent systems plus striatal efferent systems.)

"Paralytic" Chorea.

As further evidence of the point at present under consideration, reference may be made to cases of chorea signalised rather by weakness and inactivity of a limb or limbs than by "spontaneous" movements of the same. The complaint in these cases is always one of "losing the use" of the limb. Objects are dropped from the hand; the arm hangs practically motionless; weakness of grasp is often pronounced. Such cases are by no means rare, and were described originally as "paralytic chorea" by Sir William Gowers in 1880, and as chorea mollis by Samuel West. In any ordinary case, too, some muscular weakness can usually be discovered. In my experience of flaccid chorea, the greater the weakness the fewer are the spontaneous movements; with return of power the latter may for a time increase; hence the apparent paradox that the child seems to the parents to be "getting worse" when as a fact improvement has set in.

The significance of such cases will be better understood if we bear in mind the important principle that "weakness" or hypokinesis and "involuntary movements" or hyperkinesis are but different aspects of activity of the same mechanisms; in one case there is underaction, in the other, overaction, of motor function. Hypokinetic chorea is as it were the obverse of hyperkinetic chorea; and we should not, therefore, seek a quite *different* mechanism for each, but rather expect to find that in the case of the latter the efferent corticospinal system is less disordered than in the former.

(7) The general state of muscle tone in chorea is of significance in relation to problems of localisation and pathogenesis. Commonly speaking, choreic musculature is definitely hypotonic, both as regards the usual and the "paralytic" type, and allows of greater extent of passive movement than in normal persons of the choreic age, say 7 to 15. Further, in numerous instances of Sydenham's chorea the knee-jerk exhibits that pendular character which is found in hypotonic cases of cerebellar origin. Though the hamstrings are passively stretched by the shortening reaction of the quadriceps their tone is relatively so low that a "stretching-contraction" does not take place; the leg, therefore, swings like a pendulum. The knee-jerk differs not in kind but in degree from the cerebellar knee-jerk, which exhibits the phenomenon often in a more striking fashion. (A cinematographic film of the pendular knee-jerk in chorea was shown.)

(8) One other clinical consideration remains before we seek to draw conclusions as to pathogenesis from our clinical data. Among the spontaneous movements of chorea are to be found many involving the muscles of facial expression; across the choreic's face flits an exaggerated smile, to be followed in a moment by an expression of preternatural gravity. Frowns, smiles, sighs, chase each other unendingly; when the choreic tongue flies back at a word into the mouth the face is often liable just then to be disturbed by a series of expressional activities. These transient emotional or mimic displays, however, are essentially *movements;* one does not, as a rule, observe individual muscular twitches, myoclonic contractions of individual muscles, never any localised muscular caricaturing as in facial spasm. If unilateral grimacing occurs, it offers the same features as facial tic. Almost invariably those

movements are bilateral which in health are bilateral; dissociation occurs in lower facial movements but not in upper, consonant with normal physiological law. I have not observed unilateral contractures of the frontalis, for example. We must not imagine the fragments of emotional facial expression exhibited haphazardly by the choreic to correspond to any existing emotional state of the moment; rather are they to be regarded as a release of the efferent side of the mechanism for the expression of the emotions. In a previous communication evidence has been adduced suggesting a cortical (non-rolandic) site for the central representation of mimic expression, and if this hypothesis is worthy of credence we may suppose in chorea a double condition of release: (1) the "voluntary" motor system (corticospinal system) is usurped by "involuntary" movements; (2) a normally "involuntary" efferent motor system (that for the expression of the emotions) is the seat of movements not occasioned by normal sensory (emotional) stimuli, but by abnormal (choreic) stimuli. Previous allusion has been made to the possibility of such a double release.

Summary of Clinical Analysis of Choreic Symptoms.

Summarising this analysis of choreiform phenomena, we have noted the close resemblance of choreic movements to "voluntary" movements, the existence of "little signs" pointing to disturbance of corticospinal function, the occurrence both in "voluntary" and in "involuntary" choreic action of identical clinical characteristics; we have seen the connexion between "paralytic" and hyperkinetic chorea, and realised how these are but differing aspects of derangement of the same efferent mechanism; while the occurrence in confluent chorea (as I call it) of motor incoördination which clearly demonstrates the abrogation of the law of reciprocal innervation by disease has also been exemplified.

Now the argument from these clinical data which is here offered may be stated as follows: Complete paralysis, as in, say, anterior poliomyelitis, is never under any circumstances associated with the appearance of involuntary movements in the affected limbs; similarly, in the case of a recent, complete, flaccid hemiplegia no involuntary movement (post-hemiplegic chorea or athetosis) makes its appearance until there is clinical evidence of some return of power in the paralysed limb or limbs. Even in cases of severe chorea the corticospinal system is never "paralysed"; but where "paralytic chorea," so-called, is noted the spontaneous movements are at a minimum. It is difficult to resist the conclusion that *for the appearance of choreiform disorder relative integrity of the pyramidal or corticospinal tracts is essential.* The corollary is, that this integrity is not absolute, in view of (1) the presence of the choreic phenomena themselves, and (2) the above-mentioned signs or indications of slight concomitant corticospinal dysfunction. I repeat, however, with due emphasis, that *the derangement constituting chorea need not have its actual origin on the motor (effector) side of cerebral (cortical) mechanisms.*

Further argument may conveniently be postponed till the clinical phenomena of athetosis have been subjected to analysis.

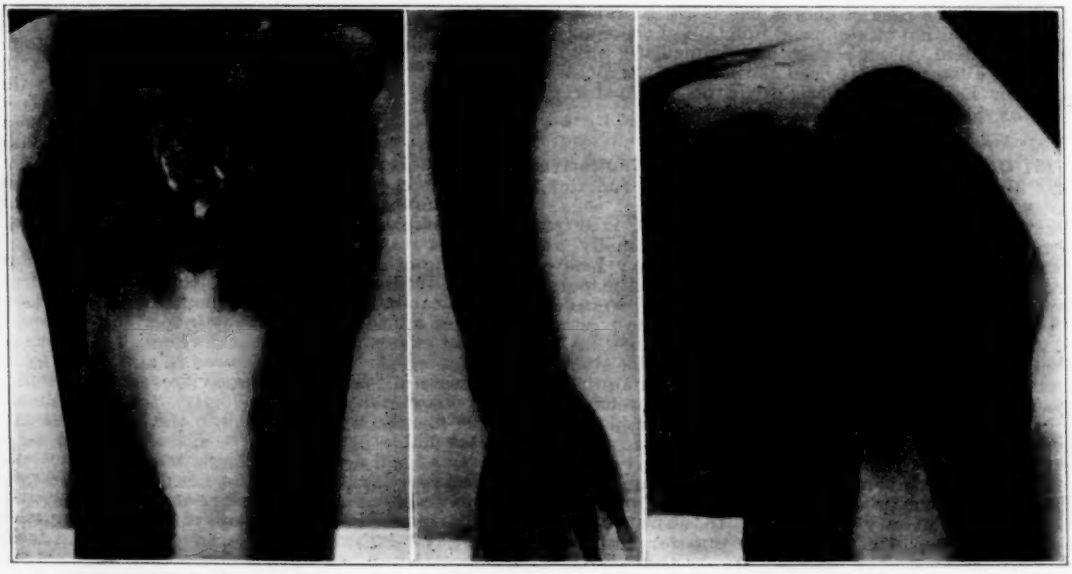
A CASE OF HEREDITARY DEFORMING DYSCHONDROPLASIA.

BY A. G. ORD, F.R.C.S. EDIN.,
HON. ASSISTANT SURGEON, ROYAL PORTSMOUTH HOSPITAL.

THE following case of hereditary deforming dyschondroplasia seems worth recording, especially as there is available a genealogical tree of considerable interest.

The patient, a boy of 14 years, was brought to my clinic by his mother with the story that "neighbours say that the boy has broken his arm." The boy was well developed for his age, but distinctly shorter than normal. He had a markedly sallow complexion, and was inclined to be "flabby." He was said to be "dull" intellectually. On examination his right forearm, when flexed on the elbow in the fully supinated position, with his arm at the side, was found to go across his body until his right hand rested on his left shoulder. No olecranon could be felt, and on further examination the distal end of the ulna was found to terminate in a bulbous extremity some 1 inch proximal to the wrist-joint. There was marked ulnar deflexion of the hand, but no fixed deformity in any

FIG. 1. FIG. 2. FIG. 3.

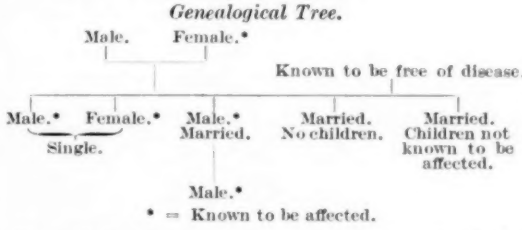


Hip-joints and femora. Right forearm. Left shoulder.

way. Both humeri at their proximal extremities appeared to be expanded, and although the left arm was less affected than the right, yet many irregular bosses could be felt. Both trochanters felt larger than normal, but were not raised above Nelaton's line. Around the knees and ankles many large and irregular bony prominences could be felt. The head, spine, and scapula appeared to be free of any abnormality. The accompanying X ray pictures show the outstanding features of the case. The only complaint was that stated above. But on carefully questioning the patient—originally a left-handed boy—he volunteered the information that he had difficulty in writing with his right hand which he had been made to use at school. Again, he stated that he could not play football very well because he could not run for long, presumably due to the accompanying coxa valga. The father also submitted himself to X ray examination, although he had no complaints excepting that he noticed his hips hurt him when he put his legs wide apart. The lesions found were of precisely similar nature, but their distribution was different, the chief bones affected being ilium—a boss on the ilium being almost contiguous with the greater trochanter on the left side—femora, tibiæ, and fibulæ and, to a lesser extent, the bones of the upper extremities. In every instance, however, the child's deformities were far greater, as demonstrated by X rays. This may be due to a worse affection or possibly to the fact that as adult life approaches some of the cartilage gets absorbed.

The family history is of interest, and although it is not quite complete yet the genealogical tree appended suggests strongly that the disease or abnormality is directly transmitted from a previously affected subject.

Genealogical Tree.



No satisfactory explanation has been offered for this remarkable condition, the most favoured theories being cartilaginous rests and thyroid or, at any rate, endocrine inefficiency. The latter is lent a little weight perhaps by these cases.

The boy was definitely a little below average in intelligence and had a peculiarly earthy complexion. The father also might possibly be indicted on the count of having said, with reference to the condition of his knees, that he thought "everyone was like this." These are, however, very slight indications and may easily be overstressed.

Medical Societies.

PATHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

A MEETING was held in the School of Pathology, Trinity College, Dublin, on July 10th, Prof. J. T. WIGHAM in the chair.

W. M. CROFTON (Dublin) urged that definite evidence of the ætiological relationship of microbes to disease could be obtained by the protective and curative results obtained with small doses of the organism. The fact, for example, that minute doses of "influenza" vaccine had a favourable effect on cases of lethargic encephalitis could not be neglected in considering the cause of that disease.—J. W. MCLEOD, G. M. DUTHIE, and H. V. PHELON (Leeds) discussed the significance of the production of alkali in cultures of the meningococcus and gonococcus.—J. W. BIGGER (Dublin) had studied the hæmolysin of *Staphylococcus aureus* and found two bodies with a hæmolytic action, one heat-labile and acting on human and horse corpuscles, the other, relatively heat-resistant and produced much more slowly, acting on sheep and ox cells.—T. DALLING (London) showed that sheep could be satisfactorily protected in the field against braxy with a mixed vaccine of culture filtrates of *B. chauvei* with *Vibrion septique* toxin and antitoxin; laboratory experiments indicated that protection against blackleg could be obtained in the same way.—A. E. BOYCOTT and C. PRICE-JONES (London) found that violent exercise determined illness and death in rats fed with cultures of Gaertner's bacillus though it had no obvious ill-effect on inoculated animals.—C. PRICE-JONES and N. D. BALL (London) described a chronic epidemic of Gaertner infection in a laboratory stock of rats; in about 15 months 19 deaths occurred in some 600 animals, and when the surviving animals were killed and examined signs of infection were found in 28 of 142. The organism was of low virulence and there was little parallelism between the occurrence of the bacilli in the spleen and of specific agglutinins in the blood.—S. C. DYKE (Wolverhampton) traced the rise and subsequent fall in the number of blood platelets after splenectomy in a case of acholuric jaundice; there was some eosinophilia, but the changes in the platelets had no apparent relation to the changes in the red corpuscles or leucocytes.—W. J. WILSON (Belfast) described a method of counting blood cells without a hæmocytometer by the use of a standard suspension of stained red corpuscles.—J. S. DUNN and NORA A. LOVETT (Manchester) had studied the later stages of experimental oxalate nephritis in rabbits. Anatomically, there was atrophy of the convoluted tubules with condensation of the connective tissue in slight cases and some fibrosis in more severe examples; the glomeruli seemed hardly affected. The functional capacity of these kidneys was tested by putting the animals on a dry diet. This normally leads to a considerable decrease in volume of urine with a rise in the urea percentage and a concentration of urea from blood to urine of about 250 times. In the nephritic animals the kidneys were almost or quite unable to effect this concentration and the blood-urea rose to a dangerous extent when water was withheld.—J. S. DUNN (Manchester) described a case of unexpected death in an infant associated with multiple hæmorrhages in the parathyroids.—A. E. BOYCOTT and C. DIVER (London) drew attention to the occurrence of monsters and very high embryonic mortalities in certain strains of snails obtained in their breeding experiments, fatality being associated with uncertainty as to the direction of the spiral twist of the shell.—J. T. WIGHAM and E. C. SMITH (Dublin) demonstrated a series of kidney tumours, W. J. WILSON (Belfast) a simple apparatus for plate cultures of anaerobes, B. W. LONGHURST (Bath) a series of microphotographs taken with the Davon super-microscope, E. E. GLYNN (Liverpool) a gonorrhœal stricture of rectum and two large cutaneous horns, M. J. and C. STEWART (Leeds) a renal hypernephroma and a chondrosarcoma of tibia which had permeated veins, A. L. TAYLOR (Leeds) a primary actinomycosis of muscle and a very early anthrax pustule, W. G. BARNARD (London) a series of human parathyroids showing the two types of cells, an angeioma of the parathyroid, and specimens showing squamous epithelium in the stalk of a normal pituitary and in a pituitary tumour.—G. S. WILLIAMSON and INNES H. PEARSE (London) reviewed the functional changes in the thyroid in the light of Aschoff's conception of the reticulo-endothelial system.—T. HOUSTON (Belfast) described experiments on the amœboid and phagocyte activity of leucocytes in blood and pus, and a new method of doing Arneth counts.

Reviews and Notices of Books.

THE MINISTRY OF HEALTH.

By Sir ARTHUR NEWSHOLME, K.C.B., M.D., F.R.C.P. The Whitehall Series. London: G. P. Putnam's Sons, Ltd. 1925. Pp. 265. 5s.

Sir Arthur Newsholme, who was Principal Medical Officer to the Local Government Board from 1908 to 1919, provides an interesting survey of public health work. Like the other volumes in the series, it is designed to meet the needs especially of Members of Parliament and civil servants. The first chapters deal with the early institution of public health work in connexion with the Poor-law and the formation and development of the Local Government Board, culminating in the creation of the Ministry of Health. Subsequent chapters describe the gradual growth of local public health work, and the author points out as an obstacle to efficient sanitary organisation the existence of the smaller units of administration. He believes that the formation of larger units with more comprehensive duties would help to remove a certain lack of local patriotism evidenced by the failure of rate-payers to vote at local elections. Responsible local authorities for health work are not always secured, and this, the author considers, makes it hard to balance central and local control, while he holds that a preliminary training or experience in local administration would increase the efficiency of the members of public services. In a chapter on the scope of public health work it is suggested that each medical practitioner might become a medical officer of health in the range of his own practice, acting, no doubt, under the principal officer, envisaged by the creation of large areas. We gather that, in the author's view, coördination locally is more important than coördination centrally, and that the greatest need is devolution on a large scale to county councils and county borough councils and a higher measure of trust in these bodies. The existence of the majority and minority reports of the Poor-law Commission issued in 1909 did not excuse, in Sir Arthur Newsholme's opinion, the inauguration of a national insurance against sickness which ignored existing official conditions and arrangements. Both of these reports at any rate agreed that the boards of guardians should be abolished and their duties transferred to county councils and county borough councils, and as a similar recommendation was made by the Maclean Committee in 1917, it is difficult to find reasons for further delay.

Large sections of public health work, including vital statistics and quarantine questions, are not dealt with in any detail, and from the author's preface it may be gathered that he found the story which had to be told too long and elaborate for the conditions of its telling. Much, however, may be learned from its pages.

THORACIC SURGERY.

Die Chirurgie der Brustorgane. Vol. II. By FERDINAND SAUERBRUCH. Berlin: Julius Springer. 1925. 258 gold marks (=£12 18s.).

THE second volume of Sauerbruch's monumental work on the surgery of the chest contains 1075 pages, 715 illustrations, many of them in colour, and weighs 6 lb. 12 oz. The first volume, which appeared five years ago, dealt with the anatomy and physiology of respiration, the general pathology of disease of the thoracic viscera, diagnosis by means of radiology and clinical methods, anæsthesia, pressure chambers, and the general technique of thoracic surgery and special forms of operations on the lung. The present volume shows the same breadth of outlook and attention to detail. It deals in succession with the surgery of the mediastinum, the heart and pericardium, the large blood-vessels, the thymus, the œsophagus, the diaphragm, and the pleura; and included in it is the second edition of the "Technik der Thoraxchirurgie," by Sauerbruch and Schumacher, which was issued by the same publisher in 1911. The two volumes embody painstaking pioneering work of the first order, and form the most important publication on thoracic surgery that has yet been made. The interest is not confined to the surgeon, for many aspects of thoracic disease have been considered, from secondary carcinoma of the breast involving the parietes, to tuberculosis and tumours of the lungs, animal parasites of the pleural cavity, and gunshot wounds. On each and every subject important help is given in diagnosis as well as operative technique. The bibliography extends to 110 pages. The book excels alike in composition, material, and production.

PRACTICAL CHIROPODY.

By E. G. V. RUNTING, a Founder and the first President of the Incorporated Society of Chiropodists. London: The Scientific Press. 1925. Pp. 164. 5s.

IT is many years since a treatise on chiropody has been published in England, and this book is a great advance on its predecessors. A full account is given of the treatment of corns, plantar warts, and affections of the nails, and a useful chapter follows on the pads and plasters which the skilful chiropodist applies after he has laid down his knife. The book is a clear indication that the modern chiropodist is taking his calling seriously, and is using scientific knowledge to improve his work. The pupil is warned not to go outside his sphere and always to order the client to consult a doctor in cases where there is any suspicion that the trouble arises from a constitutional rather than a local cause. In place of the word "corn" the author employs "heloma," a pseudo-classic word recently coined by American chiropodists to enhance the dignity of their calling.

LISTER AND HIS ACHIEVEMENT.

By Sir WM. WATSON CHEYNE, Bt., K.C.M.G., C.B., F.R.C.S., F.R.S., &c. London: Longmans, Green and Co. 1925. Pp. 136. 7s. 6d.

THE first Lister Memorial Lecture, delivered at the Royal College of Surgeons of England on May 14th, 1925, was reported in our issue of May 16th and is here issued in book form. Sir Watson Cheyne tells us in his preface that it was his wish to give a short history of Lister's work, but that he found it impossible to do so within his compass. The lecture illustrates Lister's character and the general plan of his work, while the details of Lister's researches and investigations appear in the form of an appendix to the book. Among the army of those who have tried to minimise human suffering, and have seen success crown their endeavour—an army in whose ranks stand John Howard, Elizabeth Fry, Florence Nightingale, Samuel Romilly, Henri Dunant, and Louis Pasteur—the name of Lister is by no means the least, and it is fitting that one who was one of his earliest pupils and most devoted follower should be the first to proclaim his master's praise in a memorial lecture. The story of Lister's struggles and success is, as Sir Watson Cheyne says, a "most fascinating tale, and its influence on the life and health and usefulness of mankind surpasses all imagination; and it is a true story." There is no reader of our pages but knows what surgery was before Lister's time, and how after his discoveries an operation was in general terms no longer the gate of the grave, but that to life and freedom from pain and suffering. No great discovery has ever been made without much toil, much anxiety, many falls and risings again, and bitter disappointments before success was achieved, and Lister in his work was no exception. The story of his life's work is now old, but it bears re-telling, and no one has told it better than Sir Watson Cheyne. Everyone, whether medical man or layman, should read this lecture, for it is a record of a struggle for the benefit of humanity crowned by success which has rarely been equalled.

PATHOLOGY.

Surgical Pathology. By WILLIAM BOYD, M.D., Professor of Pathology, University of Manitoba; Pathologist to the Winnipeg General Hospital. London and Philadelphia: W. B. Saunders Company. Pp. 837. 45*s.*

THIS book is an attempt to present those aspects of pathology which are of immediate importance to the surgeon. Though much that is necessarily included in works on general and special pathology is omitted, enough remains to make a volume of considerable size. It is difficult to see how it could have been shortened without cramping the author's scheme. The book is divided into two parts dealing respectively with general and special pathology. The chapters on general pathology are short and concise, and we think the author has exercised sound judgment in deciding what to include and what to leave out. Special pathology is treated more fully. The book is copiously illustrated and most of the figures are excellent.

Prof. Boyd is to be congratulated on a work which will assuredly find a place in pathological and surgical libraries. Our only regret is that the price of the volume makes it unlikely that the average student will be able to include it in his personal collection.

A Text-book of Pathology. Third edition. By J. MARTIN BEATTIE, M.A., M.D., Professor of Bacteriology, University of Liverpool; and W. E. CARNEGIE DICKSON, M.D., B.Sc., Director of the Pathological Department, Royal Hospital for Chest Diseases, London. London: William Heinemann. 1925. Pp. 1103. 42*s.*

EXCEPT for a few minor alterations this is a reprint of the second edition of this text-book, reviewed in THE LANCET, 1921, ii., 232 and 964. The only change of any importance is one of format, for the original two volumes are now bound together as one. It is perhaps a convenience to have the whole book in one cover, though it makes a massive volume to hold; the student will probably appreciate a change which reduces the cost of a popular text-book from three to two guineas.

Pathogenic Micro-organisms. Eighth edition. By WILLIAM HALLOCK PARK, M.D., Professor of Bacteriology and Hygiene, University and Bellevue Hospital Medical School; ANNA WESSELS WILLIAMS, M.D., Assistant Director of the Bureau of Laboratories, Department of Health; and CHARLES KRUMWIEDE, M.D., Assistant Director of the Bureau of Laboratories. Philadelphia and New York: Lea and Febiger. 1924. Pp. 811. $6.50.

THE eighth edition of this well-known text-book has been thoroughly revised and in part rewritten, and new matter, dealing with immunity, scarlet fever, measles, typhus, and tularæmia, has been added. The classification and nomenclature of the Society of American Bacteriologists have been adopted, so that the book has an authoritative flavour. A large and comprehensive summary table has been added, giving the essential characters of the pathological conditions caused by the commoner organisms. It is a useful table, but the only way to prevent its rapid disintegration by wear and tear would be to mount it as a wall diagram, and it is, unfortunately, printed on both sides of the paper.

ALLEN'S COMMERCIAL ORGANIC ANALYSIS.

Fifth edition. Vol. III. Edited by S. S. SADLER, E. C. LATHROP, and C. A. MITCHELL. London: J. and A. Churchill. 1925. Pp. 732. 30*s.* net.

Volume III. of this well-known work deals more particularly with the analysis of hydrocarbons, bitumen, aromatic acids, and explosives. The section on phenols, contributed by Dr. J. B. Hill, will specially interest medical readers. A considerable amount of new work and modifications in existing analytical methods are described, and the methods for determining the phenol-coefficient of antiseptics are given in full. The cresylic acid group of disinfectants now so widely used, either in the emulsified form or in the soluble state, are dealt with in an adequate manner. The chapter on salicylic acid and the analysis of salicylates and salicylic esters is contributed by Mr. E. Horton, who has written briefly and lucidly. The volume is well and clearly printed, and the illustrations of apparatus form a useful feature of the present edition. No laboratory, whether it be concerned with subjects so wide apart as the analysis of explosives or the examination of food and drugs, can afford to be without the volumes of "Allen" as a work of reference.

PROCEEDINGS OF THE ROYAL COMMISSION ON NATIONAL HEALTH INSURANCE.*

(*Continued from p. 88.*)

THE VOLUNTARY HOSPITALS' EVIDENCE.

The British Hospitals Association.

(App. LVII. and Q. 17127–17285.)

EVIDENCE was given on behalf of this Association by Mr. H. Wade Deacon, the Right Hon. Viscount Hambleden, and Mr. J. Courtney Buchanan. They said that the treatment of insured persons by panel practitioners was incomplete because no satisfactory provision for hospital treatment was made in the National Health Insurance Act, 1911. Since the inception of the Act hospitals have always examined and, where necessary, treated, without discrimination between insured and uninsured, cases coming to the hospitals either on reference from their medical attendants or upon their own initiative.

The number of hospitals represented by the Association is 387, of which 117 are in London. The voluntary hospitals have felt very severely the general financial stress since the war, the expenses of most hospitals having increased at least 75 per cent., and many over 100 per cent. The hospitals warmly acknowledge the support that they have received from approved societies, but suggest that much more might be done, in particular with regard to out-patient treatment, for which approved societies make no contributions. The witnesses pointed out

* In previous articles the proceedings of the Commission were reported under the following headings: Introductory Note; The Scope of the Insurance Scheme (see THE LANCET, Jan. 31st, pp. 247–8); The Provision of Medical Benefit (Feb. 7th, pp. 301–3; Feb. 14th, pp. 355–6; Feb. 21st, pp. 403–5); Financial Provisions of the Act (Feb. 28th, pp. 454–7); Medical Certification and the Regional Medical Staff (March 7th, pp. 508–9); The Approved Societies and the Money Benefits (March 14th, pp. 564–5; March 21st, pp. 623–4); Evidence of the Hearts of Oak Society (March 28th, pp. 677–9); Evidence of the National Conference of Industrial Assurance Approved Societies and of the Manchester Unity Approved Society (April 4th, pp. 731–3); Evidence of Independent Order of Rechabites, of Rational Association Friendly Society, and of Miners' Societies (April 11th, pp. 784–6; April 18th, p. 839); Evidence of Mr. Alban Gordon (April 18th, pp. 839–40); Evidence of Joint Committee of Approved Societies, of Stock Exchange and Lloyds' Health Insurance Societies, and of Group of Catholic Approved Societies (April 25th, pp. 889–91); Evidence of the National Insurance Beneficent Society (May 2nd, pp. 943–4); Evidence of the British Medical Association (May 9th, pp. 993–5); Evidence of the British Dental Association and other Dental Organisations (May 16th, pp. 1044–6); Evidence of the Insurance Committees (May 23rd, pp. 1097–8); Evidence of Various Approved Societies (May 30th, pp. 1135–6); Evidence of the British Medical Association (June 6th, pp. 1184–6; June 13th, pp. 1248–50; June 20th, pp. 1315–6); Evidence of other Medical Bodies (June 20th, p. 1316; June 27th, p. 1348); Individual Evidence (June 27th, p. 1348); Medical Services in the Factory, Ministry of Health Inquiry Room, Evidence of National Sailors' and Firemen's Union and of Loyal Order of Ancient Shepherds (July 4th, p. 36); Evidence of Friendly Societies' Medical Alliance, South Wales and Monmouthshire Alliance of Medical Aid Societies, Friendly Societies' Medical Officers' Union, Association of Approved Societies, Standing Committee of Scottish Insured Women, and Society of Medical Officers of Health (July 11th, pp. 86–8).

References to the paragraphs in the printed statements issued as appendices to the reports of the oral evidence are given thus: "App. X. 69," and references to the oral evidence thus—Q. 1369.

that the out-patient special departments of the voluntary hospitals—i.e., the dental, throat, nose and ear, massage, electro-therapy departments, and special clinics—are utilised for special cases, not only in the general diagnosis of the patients' complaints, but also in their subsequent treatment and relief. All of these special departments are extremely expensive to the hospitals.

In suggesting further financial help from insurance funds, the witnesses stressed the point that they did not desire any compulsory levy, nor must there be any contract to treat insured persons as such. It was essential that the voluntary hospitals should preserve their voluntary status.

(Q. 17159.) You do not agree that a statutory requirement that the National Health Insurance funds should be drawn on for the support of the hospitals involves necessarily a certain measure of representation and control?—It is a matter of opinion, I suppose. I think that if there is a compulsory levy then there is reason for some control or some representation and that is rather my objection to anything compulsory in connexion with voluntary hospitals.

Viscount Hambleden thought that it would be dangerous to ask for anything in the nature of a block grant; what was desired was payment for services rendered. It would be objectionable to contract to give preferential treatment to insured persons. The object now is to keep the beds filled with the worst cases. Whether persons are insured or not does not enter into the question from a medical or hospital point of view.

As to financial assistance from insurance funds affecting voluntary contributions, the witnesses pointed out that—

(Q. 17170.) The Government gave a grant of half a million to be distributed by the Voluntary Hospitals Commission to help hospitals. Some people thought that would be the end of voluntary contributions. The contributions are rather bigger than they were before the grant was made.

As to the suggestion that panel practitioners referred to hospital unnecessarily cases which could be equally well dealt with by them in their own surgeries, the witnesses all agreed that no general charge of this sort could be sustained, although there might be individual cases.

The Sheffield Joint Hospitals Council.

(App. LVIII. and Q. 17286–17383.)

This Council represents seven different institutions in Sheffield, each having its own autonomy. It is a consultative and advisory body. Its spokesmen were Sir Henry Hadow and Mr. S. R. Lamb.

They said that a National Health Insurance service is not complete without the coöperation of the voluntary hospitals where the services of specialists and special equipment are available. The Council are encouraging the view that a voluntary hospital should be used largely for consultative and operative work, and a consistent effort is maintained to discourage treatment being given in the out-patient department of our hospitals which could as effectively be given by a panel doctor. In this respect they had no reason to think that there had been any abuse.

(Q. 17296.) The insured people who come to the hospitals in the first place roughly fall into three classes. There are the casualties who come because it is the nearest place; there are the people who want specialist advice, and who are recommended by their panel doctor, and come with his recommendation; and, thirdly, there is a small percentage of people who come because they do not know any better. They live in some poor part of Sheffield; they get ill and frightened, and they say: "I will go to the hospital." In those cases they come to the hospital, but I do not think there is any abuse.

It was probable that the third class were women and children mainly and not insured persons at all.

This Council suggests that the out-of-pocket expenses of maintaining insured in-patients and out-patients in a voluntary hospital should fall on the National Health Insurance funds. In any case, such expenditure by the voluntary hospitals on insured persons should, in future, be the first claim on the quinquennial surplus declared by the Government auditor.

Without wishing to suggest an exact proportion, they hoped that the contributions of societies which at present was about 15 per cent. of the cost of maintenance might go up to, say, 50 per cent.

In connexion with the voluntary character of the hospital administration and the importance that this should not be impaired, it was stated that the moral value of the contributory scheme in Sheffield is very great. It has brought 200,000 workmen into personal touch with the hospital work, and they have formed a Contributors' Council, which is of the greatest value. If grants from insurance or the public funds involved inspection, there could be no objection to this.

(Q. 17316.) On the point of representation, knowing the mind of some of the hospital boards, I think the only thing that would really frighten them would be if there was any chance of having a salaried official put in control of the work. Nothing in the way of supervision or inspection or representation would be anything else but palatable to them.

And, again, the witnesses said that their objection only extended—

(Q. 17370.) As far as having somebody permanently on the spot who was in any way hampering the autonomy of the hospitals. We should not object to anything which corresponds to the Government inspectors who come down to our University.

The Middlesex Hospital.

(App. LIX. and Q. 17384–17482.)

This evidence, given by Mr. A. E. Webb-Johnson and Mr. Walter Kewley, covered to some extent the ground traversed by the previous witnesses in so far as the need for support from insurance funds was in question, and was summarised in the form of a question by Sir John Anderson as follows:—

(Q. 17423.) The voluntary hospitals are meeting a recognised public need; they can only continue to meet that need if they receive financial support on the widest possible basis; they have, therefore, a strong moral claim on any section of the community which is in a position to contribute to their funds: in so far as approved societies have money at their disposal which could be made available for this purpose, the hospitals may properly look to those funds for a measure of support; and, quite apart from that, they are entitled to look to the individual patients, whether insured or no, who benefit by the service that the voluntary hospitals provide, to contribute according to their means.

It was recognised that support to the hospitals from insurance funds, if imposed by statute, must carry with it some inspection to see that an efficient and proper service was being rendered. The strain on the finances of voluntary hospitals did not imply any failure of the voluntary system, but it was due to the fact that the work done is greater in volume than it ever was before.

In regard to insured patients, Mr. Kewley thought there was a tendency on the part of some insurance practitioners to send patients for out-treatment which they could quite well give themselves. The witnesses thought that it was a defect of the Insurance Acts on the one hand, that no satisfactory provision is made for incurable cases which may require treatment over a lengthy period—e.g., cancer; on the other hand, the value of preventive treatment is not sufficiently recognised under the Acts.

Generally, on the need for closer coöperation between the public services and the voluntary hospitals, Mr. Webb-Johnson said—

(Q. 17482.) I would urge that this Commission, in making any recommendation, should not only have in mind the benefit to the insured person. . . . I think in recent years, when the State has been taking a greater part in the treatment of certain diseases, they have not always done it in ways which give promise of the best results. I maintain that for the sake of medical education and research and the advancement of our knowledge, it is to be deplored that when public authorities have assumed responsibility for the treatment of certain classes of disease they have not sought a closer coöperation with our great hospitals and medical schools which are the scientific centres of medical progress. It is to be hoped that these authorities will see the wisdom of establishing some of their treatment centres actually in, or in close association with, our great hospitals rather than in separate institutions.

THE LANCET.

LONDON: SATURDAY, JULY 25, 1925.

THE CANCER VIRUS.

As we indicated last week, the work of Dr. GYE and Mr. BARNARD is as significant for its promise as for its performance. "By a theory," said MENDELÉEFF, "I mean a conclusion drawn from the accumulated facts we now possess which enables us to foresee new facts which we do not yet know." The identification of the virus and the brilliant demonstration of its coöperation with inanimate substances in the production of tumours appears to give us at once a means of testing anything for the presence of either. If a mixture of any substance with a chloroformed extract of the Rous chicken sarcoma gives rise to a tumour when it is inoculated into a fowl, the substance may be presumed to contain the virus. If a chloroformed extract of any tissue inoculated into an animal of the same species along with a fresh extract of a tumour from another species of animal causes a tumour to appear, the tissue may be presumed to contain the accessory substance which Dr. GYE calls the specific factor. At present the experiments throw little direct light on the *de novo* origin of tumours; no tumour appears to have been produced except from a pre-existing tumour. But methods have been found which should quickly illuminate the question of direct causation. When a tar cancer is produced, does the virus come from outside or is it generated in the skin? What are the conditions of time and place under which the specific factor appears? The distribution of the virus can be ascertained and the conditions under which the specific factor arises in the body can be worked out. Especially we shall be most interested to hear what happens when the fundamental experiments are repeated with the substitution for tumours of normal tissues, and tissues in various abnormal states associated with death and regeneration. From the wide distribution of the virus and the absence of specificity, it seems not unlikely that it may be a normal component of the body; it has proved possible in recent years to cultivate whole cells outside the body indefinitely, and Dr. GYE's results may mean that we can now cultivate also some of those components of cells which were dreamed of and dimly seen by BÉCHAMP in his microzymes and ALTMANN in his bioblasts. If that proved to be the case, the important point in the causation of cancer would be the origin of the specific factor, and the possibilities of successful immunisation would become more remote. Or it may turn out that the virus does not normally exist in the body at all, but is generated within it in something of the same relation to the cells as the bacteriophage has to bacilli. Imagination can run on almost indefinitely, and in this case legitimately, for it is now plainly possible to submit these and many other speculations to experimental test; in this possibility lies the largest importance of the new discoveries.

There are two ways of formulating the problem of the causation of cancer. We may say: "Why do some people have cancer?" or we may say "Why does not everybody have cancer?" It is the same question, but the two ways of setting it out come from different points of view. Most people have started their thinking from the first mode of presentation. There are, however, many reasons for believing that the body does and can resist cancer to some extent, and in all the revision of our present array of facts which the work of Dr. GYE and Mr. BARNARD has made so absorbing, it would be well to bear the second point of view in mind as well. A given chain of circumstances is not to be ruled out as a "cause" of cancer if it does not always produce cancer, and like any other mode of growth cancer is a resultant of the reaction between cells and their environment. The whole problem is being steadily cleared up. The demonstration by E. F. BASHFORD and his colleagues that something may pass out from a carcinoma cell which induces the neighbouring connective tissue to become sarcomatous, is one landmark; the discovery of the Rous chicken tumours was a second; the production of tar cancer by YAMAGIWA and ISHIKAWA was a third. The present discoveries push the experimental study of the cause of cancer a great deal further and reasonably encourage us to hope that the fundamental facts may soon be reflected in human experience.

Throughout the communications published last week in THE LANCET both authors regarded their work as requiring in many places confirmatory evidence, and obviously other experiments must be done in certain directions before more than tentative opinions can be formed. We note with pleasure the promptitude with which this situation has been recognised by the trustees of the late Sir WILLIAM DUNN, who have made a donation to the Medical Research Council of £2000 per annum for a period of five years to be used for the promotion of research work in medicine at the discretion of the Council. The Dunn trustees have already made important benefactions to the advancement of medicine, for they endowed a chair of pathology at Guy's Hospital, and another in biochemistry at Cambridge, erecting a school for the purpose; they have also built and equipped laboratories for the University Medical Clinics at St. Bartholomew's Hospital, St. Thomas's Hospital, and the London Hospital, and have given a new building for the School of Pathology at Oxford. The Medical Research Council, in accepting this generous benefaction, have intimated that for the present they will apply this special Dunn Fund in chief part to the furtherance of the organised studies of filterable viruses which they are supporting, and in particular to the recent developments of work in relation to cancer by Dr. GYE, Mr. BARNARD, and their colleagues.

THE BRITISH MEDICAL ASSOCIATION AND INDIVIDUAL DEFENCE.

THE Annual Meeting of the British Medical Association had its prelude at Bath on Friday last, July 17th, when Dr. H. B. BRACKENBURY presided over the Representative Body for the first time; on taking the chair he received an enthusiastic welcome from an assembly which knew how much the activities of the Association of recent years have owed to his enthusiasm and his industry. As will be seen from the report which we are privileged to make of the deliberations of the Representative Body, Dr. BRACKENBURY had a smooth time, for few of the motions on the agenda put forward by the Council of the Association for ratification provoked dissent, or even led to more than cursory debate. The agenda formed really a record of progress on the administrative side, while the financial statement made with great clearness by the treasurer, Mr. BISHOP HARMAN, was a cheerful one indicating that increased expenditure, even to a record figure, had been accompanied by increased revenue and increased surplus. Two motions

of the Council were, however, followed by keen discussion; the first of these was a proposal to establish a bureau for the provision of locum-tenents and assistants, and the second was a request by the Council for an authority from the Representative Body to prepare a draft scheme for a medical defence organisation to be affiliated with the Association. Both these motions had the common origin of a desire to help the recently qualified men and women, as they are recruited by the Association, and when they are faced for the first time with the necessity of finding a sphere in which to exercise their newly acquired rights, and with the accompanying necessity of avoiding professional risks.

With regard to the bureau for locum-tenents, the Council secured endorsement for the policy advocated. The opposition of existing agencies for the provision of locum-tenents and assistants, and for the sale and transfer of practices, was mentioned but discounted as negligible, and the motion for starting the bureau was approved, with the proviso that preferential treatment should be given to members of the British Medical Association. But with regard to the question of the formation of a medical defence association the Representative Body, by a substantial and possibly unexpected majority, declined to permit the Council to prepare a draft scheme along the suggested lines. The question of individual medical defence was threshed out in a debate of a high order. Dr. MORTON MACKENZIE, chairman of the Organisation Committee, produced strong reasons why the necessary authority should be given to the Council to proceed with the work of medical defence. He urged that they ought to be able to defend their new members from the outset of their professional careers; that the minority in favour of such action had through many years been growing steadily larger; and that in one form of defence—namely, "Optional and Complete"—the officers and organisation of the Association could do all that would be required through the skill and knowledge possessed by the officiate. He stated that less than 7000 members willing to pay an annual fee of £1 would render the undertaking financially secure. These propositions were supported from different points of view by various members of the Representative Body, and it was made clear from the beginning that the position of the Council in again seeking a further decision on a matter which had been settled already on several previous occasions was considered to be justified in view of an apparently growing feeling among the members that they should be offered this form of protection by the Association. But on an amendment being put forward recording the view that individual medical defence was being competently dealt with by various existing bodies, the supporters of that amendment had far the better of the debate. It became clear that the Organisation Committee had been unable to bring forward any arguments which had been calculated to persuade either the Medical Defence Union or the London and Counties Medical Protection Society that their constituencies had anything whatever to gain by coöperation. These bodies were ungracious enough to decline to commit suicide, and seem to have resented the suggestion that members of the British Medical Association should be admitted to the privileges of defence by them at a reduced scale, seeing that they existed for the protection of all qualified practitioners. Various speakers brought up for attention the strong financial position of the existing societies, who are in possession of large memberships and reserve funds, with the implication that a run of bad luck against any new defence organisation established by the British Medical Association would wipe out the young fund or would result in considerable loss to the Association.

But probably the strongest argument of all against the projected departure was that brought forward by Dr. PETER MACDONALD and Mr. E. B. TURNER, both of whom, though from different angles, pointed out the extremely awkward situation in which the British Medical Association would be placed if a defence body, under the ægis of the Association, should find itself defending a practitioner where the conduct which had to be defended might appear ethically indefensible. This is not a fanciful position; it is one which might well occur. A defence in a court of law might prove successful before a jury which did not consider the ethical side germane to the issues, and yet that very side might later come under the disciplinary notice of the General Medical Council. Such was the line of thought which led to the Representative Body refusing to follow the lead of the Council in the matter of individual defence.

THE EVOLUTION OF HUMAN VISION.

MAN'S body, like his civilisation, is made up of a vast assortment of parts belonging to varying dates. Some of these parts, such as his heart and lungs, are of ancient lineage; others, such as his facial features and the convolutionary pattern of his brain, represent recent acquisitions. His eye, on which he prides himself and through which he has learned most of what he knows concerning the world in which he lives, must be placed among his older parts. Eyes such as man has, set in sockets so that their axes are parallel, each provided with a specialised area of retina at its distal pole, each furnished with six muscles for external movements and an internal muscle for accommodation, came into existence with the evolution of the Primate stock early in the Eocene period. Binocular vision, or, to be more precise, bimacular or bifoveate vision, is thus much older than the human form; it is an inheritance from a common and distant ancestry which man shares with anthropoid apes and with all forms of monkeys—both those of the Old World and those of the New. The superiority of man's vision lies not in his eyes but in the brain which has grown up behind them. Such we take to be the chief lesson learned by those who were present at the symposium "On the Evolution of Binocular Vision," organised by the Convention of English-Speaking Ophthalmologists, when it met in London last week. The history of man's powers of vision and perception was then opened out in a masterly way by Prof. ELLIOT SMITH, who was followed by Sir FREDERICK MOTT, Prof. WHITNALL, of Montreal, and Sir ARTHUR KEITH. A brief report of these speeches is given on another page. In his Bowman Lecture, which we published last week, Sir JOHN PARSONS has made clear that the superiority of human vision is psychological, not ophthalmological.

Every infant in the development of its powers of vision bears witness to the truth of Darwinism. At an early stage of fœtal development the eyes swing forwards so that their axes become parallel. Soon after birth the fovea centralis appears. While this minute area of the retina becomes specialised for acute vision, the rest of the retinal cup remains merely a reflex feeder for the central or foveate area. By the sixth week after birth the eyes begin to move together and feed their centres of acute vision. The oculo-motor and cortical centres gradually obtain control of the muscles which move the eyes; by the sixth month a stage has been reached comparable

to that possessed by adult monkeys. At the same time the muscles of the neck gain control of the head and can thus keep the eyes directed so that they may follow moving objects. Monkeys alter their field of vision by head movements rather than by eye movements. By the end of its first year a child's vision has reached a stage comparable to that of anthropoid apes —where conjugate movements become more free and temporary accommodation for near objects possible. Stereoscopic vision comes later; it begins to dawn about the third year and goes on improving up to the sixth year. These later improvements in vision depend not on the eye but on the brain. Indeed, ophthalmologists realise that it is hard to tell whether a young child's blindness is due to a defect of the brain or to one of the eyes.

With all these facts constantly before him the physician cannot well doubt the truth of evolution. Man differs from all animals in the perfection of his mental vision; compared to him all other animals are mentally blind. Human vision is Nature's greatest triumph, but it is a triumph reached by the evolution of the brain, not by the attainment of a superiority on the part of the human eye. In the oldest and most primitive of mammals the dominant sense was that of smell; their brains, as Prof. ELLIOT SMITH demonstrated many years ago, were organised on an olfactory basis. In most mammals the nose still remains a master organ. In one fortunate group of arboreal mammals, which made its evolutionary appearance early in the Tertiary part of the earth's history, the eye became the governing sense organ; the axes of their eyes became alined; a spot in the retina, situated at the distal pole of each eye, became specialised for acute sight; bifoveate vision was thus evolved. This new form of vision entailed a reorganisation of all the parts of the brain which had to do with the movements of the eyes, and with the receipt and distribution of visual stimuli. The sight-brain gradually submerged the smell-brain. In the marmoset's brain we can still see an early stage in the evolution of the visual brain; man's brain represents the latest stage of this visual series. Between these two extremes lie intermediate links provided by the brains of various types of monkeys, the cerebral outfit of the gibbon and that of the great anthropoid apes. No one who has swept an eye along this series of brain-forms can doubt the truth of evolution, nor can he fail to convince himself that the superiority of man's vision lies in his brain, for all of these Primate animals are provided with the same kind of eye—all of them are sharers of man's bifoveate vision. As visitors to our Zoological Gardens may observe, the eye movements of the orang are almost human-like in their freedom, yet they are infinitely less effective than those of man. When the orang has swept his foveate centres over an approaching visitor he has learned whether or not there is a prospect of something to eat; with a similar glance a young woman will register the cut and colour of every article on the body of her similar.

While it is manifest that man's vision is a gift of evolutionary processes, the nature of these processes remains obscure. When DARWIN'S "Origin of Species" was first published, Mr. J. J. MURPHY, of Belfast, made the criticism that chance variations could never give rise to an organ such as the eye, which requires exact adjustment in the construction of all its parts. We now realise that the evolution of man's vision involves much more than the eye and its muscles; it involves the nerve centres which control eye movements; it involves the primary optic nerve centres of the mid-brain; it involves areas of the occipital cortex and of the frontal cortex; it involves thousands of adjustments of all parts of the central nervous system. The skull and orbit require readjustment at each stage in the evolution of high vision. How are all of these widely scattered elements concerned in vision moved towards a common functional end during the development of the body? If the eye seems to be the *pons asinorum* of the evolutionists' Euclid, yet it has also proved to be the organ which has yielded the evolutionary key. We know now that the part of the brain which grows out to form the retina can cause any piece of embryonic ectoderm to form a lens; one embryonic element can control the growth of a neighbouring element. We know also, thanks largely to the researches of Dr. ARIENS KAPPERS, that developing nerve cells are brought under influences which cause them to take up new and advantageous positions and arrangements in the nervous system of the embryo. Thanks to the labours of experimental embryologists, we are beginning to know that developing groups of cells of one kind can give out substances—growth hormones —which can and do control the development of other and allied groups of cells. As the new prospect opens out, the evolution of man's vision, if it becomes a still more intricate problem yet becomes one which we may hope to solve. Somehow developmental processes are regulated on a functional basis; there must be a machinery at work in embryo and fœtus for the common control of all parts that are concerned in vision.

PROPOSED UNIT OF CLINICAL PATHOLOGY AT WESTMINSTER HOSPITAL.

THE munificence of a private donor, Mr. A. J. H. CARLILL, recently placed the sum of £20,000 at the disposal of the board of governors of the Westminster Hospital, and this they have decided to lay out in the establishment of a unit of clinical pathology around which all the work of the hospital shall centre. So to reorganise a teaching hospital as to render it primarily an institution for the study of disease is an important departure, but the difficulties in the organisation of such a scheme are immense. The scheme as now drawn up provides that the unit shall be under the management of a director, assisted by two heads of laboratories. The director will be in supreme command of the work of the unit and upon him will devolve the responsibility of determining in consultation with his colleagues what problems are to be attacked and the manner of the attack. He will have no beds, but will be expected to work in close coöperation with the physicians and surgeons of the hospital. The director will have his own laboratories. Under him will be two assistants, each in charge of their own laboratory. To ensure coöperation between the laboratories and the wards, there will be attached to the director and to both his assistants liaison officers whose duty it will be to see that their respective heads are kept cognisant of the cases in the wards. The arrangements for coöperation between the clinical and the pathological sides would appear to be as complete as they can humanly be made. Ultimately, however, success or failure must depend upon the personality of the staff. The director and to a lesser degree his assistants will necessarily require to be men possessing a thorough mastery of the general principles of pathology in its widest sense, with at the same time a sympathetic and intelligent interest in clinical work. The general trend of medical education in this country has not been such as to produce many men of the type

who desire to master the fundamentals of medicine in order that they may the better see their way in treatment.

To many the Westminster scheme will appear to be merely an interesting experiment directed towards the placing of the teaching of pathology upon a new basis. Actually it is far more. This and all other plans of a like nature must stand or fall, not as they affect the teaching and study of pathology, but as they influence the teaching and practice of medicine as a whole.

Annotations.

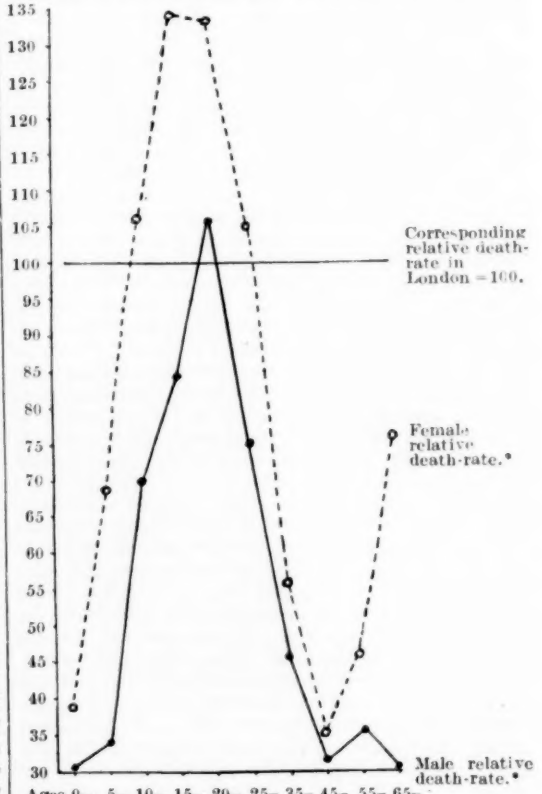
"Ne quid nimis."

INTERNAL MIGRATION AND THE DEATH-RATE.

IN a valuable though admittedly inconclusive inquiry,[1] pursued in a thoroughly scientific way, Mr. A. B. Hill has thrown new light on the problem as to what effect migration of young persons produces on the relative death-rates of urban and rural areas. The general facts obtainable from the Registrar-General's reports and quoted in Mr. Hill's report are fairly well known. Thus, in recent years the total urban death-rate for males is in excess of the rural at all ages under 75, but closely approximates to the rural rate at the age-periods 20–25 and 25–30 years. For females the urban death-rates fall below the rural rates at ages 20–30 years and occasionally also at ages 30–35. Similarly there is a higher death-rate in the rural counties from pulmonary tuberculosis at the ages of adolescence and in early manhood and womanhood, which partially explains the difference between total death-rates in urban and rural areas. The report before us seeks answers to the question why this should be, points out the difficulties inherent in the usual explanations which are offered, and throws light on the contention which has been advanced on good authority that much of the decline in the urban death-rate from phthisis is ascribable to urban migration of the more vigorous units of population and not merely to improved and more abundant food, to better housing, and to diminished dissemination of infection.

Briefly stated, the facts elicited, although not warranting dogmatic statement, appear to show that the high general death-rates from all causes in the rural parts of Essex in adolescence and early adult life are caused by corresponding high death-rates from phthisis, and that this has some relation to the migration into towns of adolescents of both sexes. The report recognises the need for evidence showing, as far as is possible, the life-history of migrants; and by securing the coöperation of clergy and others in Essex, returns have been received from some 55 villages, relating to 402 males and 367 females, of whom about one-half were migrants. It appears likely, in view of the information thus secured, that migrants have found prosperity in the town, and that their return sick to their rural homes is relatively rare. One explanation of the excessive rural death-rates at certain ages can, therefore, probably be ruled out. But it does not follow that the homekeepers—with a high death-rate in early adult life—had intrinsically worse lives. Hence an attempt is made in the report to assess their conditions in rural life as to work, to housing and environment, and to diet. No special evil condition in rural work is revealed; and although rural housing and sanitation are often unsatisfactory, this cannot be held responsible for the high mortality in early adult life, in view of the fact, not mentioned in this report but revealed by the Census figures, that there is terribly greater prevalence of overcrowding in its worst forms in towns than in rural districts.

Much valuable information is given as to rural dietaries, and this part of the report especially deserves study by the social worker. Two-thirds of the income of the Essex families investigated was spent on food, and expenditure on boots must have meant often going short of food. This would appear to have possible direct bearing on the excessive phthisis mortality in early adult life. It is pointed out in the report that the diet would probably be most defective during the first 12 or 14 years of married life, when the father is the only wage-earner, and that this corresponds roughly with the period at which rural death-rates are high; but as against this the curves of growth and weight of Essex children show no signs of malnutrition or lack of growth. If the Essex dietary is, as appears probable, below a desirable level for rural workers, the low phthisis death-rates which are lower than those for London except at ages 20–25 for males and at ages 10–35 for females (see figure below), do not appear to be consistent with the view that malnutrition has borne a large part in the result. It appears highly improbable that the effect



Phthisis, 1901–10.

* In ten rural registration areas in Essex.

of deficient food, even though the deficiency were greatest at these ages, would be limited to adolescence and early adult life. Nor can the "worse housing conditions" in rural districts, to which attention is drawn, be held to explain these differences, for surely their effect would not be shown to such a preponderant extent in early adult life; and as has been pointed out, room-famine is much greater in towns than in rural districts. In towns, furthermore, the opportunities of gross and repeated infection are much more numerous than in rural districts.

The report is a careful review of a difficult and intricate problem, presenting many variables, some of them elusive in nature. It should be studied by all social workers as a competent statement of methods of investigation, of ways for overcoming these, and of caution in deducing results.

[1] Internal Migration and its Effects upon the Death-rates with Special Reference to the County of Essex. By A. B. Hill, B.Sc. Medical Research Council, Special Report Series, 95, 3s. 6d.

MONKEYVILLE.

MOST respectably-minded people are deeply shocked at the idea that those who are doubtful about the truth of evolution are numerous enough in Tennessee to pass a law forbidding school teachers to inculcate their pupils with the doctrine that man is in relationship with the apes. It is not a mere question of scientific conformity. Evolution has explained so much to so many of us in the last 60 years that almost everybody finds the world unintelligible without it; linking itself with the idea of progress, it has given all of us a buoyant optimism which is at once a comfort and effective. It seems almost beyond belief that there should be those who would gladly throw overboard such an admirable aid to good living. The prosecution of a young school teacher for breaking a law with which he was presumably well acquainted is, of course, of no great moment. It is the natural consequence of a rash and perhaps defiant act. Nor does it matter very much that such a law should exist. It is generally, if not universally, agreed in the United States that no religious teaching of any kind or description should be given in the public schools, and it is a reasonable corollary that anti-religious teaching should be prohibited too. And if such an understanding exists, it is compatible with common sense and toleration that very wide meanings should be attached to religious and anti-religious. It follows, too, that there are bound to be considerable and sincere differences of opinion as to where exactly the limits of these meanings are to be fixed, and it is possibly the wisest course to determine that in public education they must not even be approached.

Few people now are in the position of the majority 60 years ago in finding serious incompatibilities between science and religion. Difficulties there are and will continue to be, though they are chiefly difficulties of method rather than discrepancies in results. Revelation, for example, is not recognised in scientific circles as an appropriate way of getting information about the material world. But the existence still of a minority who find in the theories of science or, which may be more important, in the way and tone in which they are presented, something seriously discrepant with their particular religious revelation must be recognised, and if in some place they are a majority their will must prevail. Mr. Scopes has been found guilty of violating Tennessee law and (subject to appeal) has been fined one hundred dollars. But very little harm is being done either to the progress of knowledge or to the promotion of sound education. There are other educational agencies for young people besides, and perhaps more potent than, the school teachers, and those of us who do believe in evolution need not be too violent in our natural response to the new shock from America.

EXPERIMENTAL PATHOLOGY OF EPIDEMIC ENCEPHALITIS.

THE literature of the experimental pathology of this condition is a mass of contradictions, the whole dispute turning upon three debated points: The susceptibility or non-susceptibility of the rabbit to the disease, the identity or non-identity of the virus of this disease with that of febrile herpes, and the significance of certain lesions in the brains of experimental animals. On the one hand J. McIntosh, in this country, and a group of workers at the Mount Sinai Hospital in New York, have claimed that the disease is transmissible to rabbits with the greatest ease, whilst, on the other hand, S. Flexner, of the Rockefeller Institute, has stated that in many attempts he has never succeeded in doing this. A middle position has been taken up by C. Levaditi, of the Pasteur Institute, who states that the rabbit is susceptible but is only exceptionally infected successfully, and upholds at the same time the theory that the virus of febrile herpes—which produces indistinguishable lesions—is the same as that of encephalitis. Amongst recent contributors to this vexed study J. R. Perdrau[1] finds that whilst direct transmission of the disease to rabbits by the inoculation of human material is generally ineffective, by certain methods which he has devised the difficulty may be overcome and infection set up. He believes that an "aggressin" is associated with the virus, and that by using an inoculum in which this is artificially increased a "take" may be assured. The substance which he uses for this purpose is the brain of an animal previously inoculated intradermally with herpetic virus and in which organ the virus is presumably present. In addition the number and routes of inoculation of the encephalitic brain are multiplied. By these means two out of three cases of the human disease provided an active virus, and by another manœuvre a third case gave a like result. Perdrau assumes, as is necessary for his explanation of his results, that the herpetic and encephalitic viruses are identical. This is not in the least certain, and is ill-supported by clinical evidence; it is, moreover, difficult to be certain that the alleged aggressin does not contain a certain amount of active herpetic virus, or that the very intensive inoculation employed may not have been a determining factor. Flexner,[2] who, together with H. L. Amoss, has extensively studied the two conditions, definitely takes the view that the herpetic virus is a ubiquitous material and a very likely contaminator in such experiments. He does not, moreover, consider it merely a special variety of the encephalitic virus, and shows that whilst the serum of animals inoculated with the former exerts a neutralising action upon this virus, the serum of human cases which have recovered from encephalitis has no such effect. It cannot, therefore, be said that this crucial point has yet been cleared up.

HYGIENE IN FACTORIES.

ANYONE who compares the spirit pervading the latest annual report[3] on factory inspection with one of its forerunners of 25 years ago cannot fail to note how the work of the inspectorial staff has become less that of enforcement of statutory requirements by penal prosecutions, and more that of advice and help to employers who are coming to regard the inspectors as friendly experts rather than inquisitorial detectives. Although during the period under review trade was depressed, bright spots are reported: electrical developments, motor transport, and railway plants were busy; the output of carpets, linoleum, and furniture was brisk; fish-curing was prosperous; while new industries started, such as the Schmiedal process of making sulphuric acid and refining crude petroleum from Persia. Labour-saving devices continue more and more to improve working conditions, quicken production, and minimise occupational risks. Factories again increased in number and workshops declined, and for the first time on record the former with 142,494 outnumbered the latter with 133,729; the figures portray the tendency for small places to be absorbed by the big and for power to be used to replace human effort. The section dealing with safety tells how accident prevention is being scientifically approached through attention directed to different types and causes of mishaps. Owing to an alteration in the legal definition of an accident the records are not comparable with those of previous years; but we regret to find no effort made to express accident occurrence as a rate either of those employed in different industries or of man-shifts worked—what is possible for the mining industries ought at least be attempted for factory employment. Again, attention is directed to the vast number of accidents which are unpreventable by any known

[1] The British Journal of Experimental Pathology, vol. vi., No. 3, June, 1925.
[2] The Journal of Experimental Medicine, vol. xli., No. 3, March, 1925.
[3] Annual Report of Chief Inspector of Factories and Workshops for the Year 1924. H.M. Stationery Office. (Cmd. 2437.) 1925. Pp. 145. 2s. 6d.

protection, and can only be guarded against by safe working methods adopted by the workers themselves and also by foremen and managers. Instances are quoted of the beneficial results of "safety-first" work; both frequency rates and severity rates always fall. The outstanding wonder is that a policy which gives such great financial returns is being adopted with comparative slowness. One movement worthy of note as combining safety and health is the substitution of abrasive wheels for natural grindstones. The abrasive wheel is safer as regards accidents due to bursting, and does not, during grinding, generate fine silica dust; fortunately operations are performed better and more quickly on abrasive wheels. The abolition of the old-time grindstone and with it of "grinders' rot"—i.e., tuberculous silicosis—cannot now be far distant. The increased demand for electric accumulators for wireless sets has led to adoption of new regulations to protect workers from lead poisoning. Dust in cotton cardrooms has again called for investigation, as appliances, introduced 10 to 15 years ago for removing it, and with it "strippers' asthma," have been losing their efficiency; progress, in the light of experience gained, seems certain. More and more interest is reported to be taken in standards of illumination, and the department is lending scientific aid to employers to demonstrate how improvements may be effected; already the minimum standards recommended by the Departmental Committee on lighting are receding into the background as economically insufficient.

THE ENGLISHMAN'S HEIGHT.

WHAT is the height of the average Englishman? Is it changing gradually? Is evolution, as tested by this and other measurements of the human body, proceeding in England to-day? These are some of the questions which were discussed by Sir Arthur Keith in a recent paper before the Royal Institution of Great Britain, entitled Concerning the Rate of Man's Evolution. The difficulties attendant on a biometric survey of any nation or group of nations are notorious. Before the war it was commonly supposed that the average Englishman stood 5 ft. 8 in. in height, but figures gathered since have shown that is too high by at least 2 in. A popular pocket cyclopædia gives the average height of a man as 5 ft. 7 in., and if the heights of children are considered, with which Sir Arthur Keith was not, incidentally, concerned, the discrepancies between various authorities are even more marked, for striking differences have been shown to exist for country and town children, rich and poor children, in the same country.[1] If the different European nations are considered, figures from trustworthy sources go to show that the Belgian school-boy of 7, for example, is on the average 2 in. shorter than an English boy of the same age. These examples have been quoted to show how difficult it is to carry out satisfactory biometric investigations, even among living subjects, and when it comes to the measurement of fossilised remains, such difficulties are obviously accentuated. Putting aside these difficulties, however, Sir Arthur Keith was concerned with the broad question of whether evolution is proceeding at an appreciable rate at the present day in this country. Here geological and anthropological evidence appears to be at variance. On the one hand, the minute comparison of 50 skulls taken from English graves known to be at least 1000 years old with skulls of a corresponding number of men and women who had lived in England during the eighteenth and nineteenth centuries seemed to show that evolution is now at work in our midst. The palate presents the chief changes, and other modifications are seen in the configuration of the bones of the nose and jaws. The cause for this appears to lie deeper than a mere disuse of the jaws, for the changes described appear to affect about only 30 per cent. of the modern population, although all live on approximately the same dietary. Such biometric evidence, however, is distinctly opposed by certain geological discoveries, and particularly that at Galley Hill in 1888. "The Galley Hill man," says Sir Arthur Keith, "was of the modern European type," and yet on geological evidence the stratum in which this skeleton was found fixes its age at hundreds of thousands of years, and even the more modern "cultural" investigations, based upon the workmanship of the implements found in the same strata, would assign to the Galley Hill man an antiquity of 100,000 years. If the primitive human types discovered at Piltdown, Heidelberg, Java, and Rhodesia are considered in view of the fact that there is broad agreement as to the early dates at which these types lived, then evolution must have been comparatively rapid to produce modern man. As such anthropological evidence accumulates it forces the conclusion that the geological arguments connected with the Galley Hill man must be rejected. It is obvious, however, that much confusion still remains to be cleared up, and perhaps present-day anthropologists will consider their successors of many generations hence and bury an account of the measurements of an average Englishman of the twentieth century in the foundations of, say, a new Waterloo Bridge.

[1] The World's Health. May, 1924. Pp. 145.

HOSPITAL COOKS AND COOKERY.

THAT hospital food is always monotonous and often badly cooked is a venerable complaint, sometimes true and sometimes less true. Of late, however, the difficulty of getting food for hundreds of people well cooked has been conspicuously less than that of getting it cooked at all. Most hospitals are finding that cooks, male or female, are exceedingly shy and elusive creatures, not easily tempted even by what would once have seemed a wickedly lavish display of Treasury notes. The Metropolitan Asylums Board, which has 19 large hospitals in its charge, has suffered sore things in its kitchens. In 14 of them there were 57 vacancies in six months; at one hospital the kitchen staff has been incomplete for nearly two years; in another, over a period of 11 months no assistant cook could be induced to stay for more than a month. In some of these cases there may have been exceptional local drawbacks, but this unhappy experience suggests either that there is something wrong with the pay or the conditions of service or that the expectations and outlook of the kitchen staff are unreasonable. However this may be, the Board have determined upon heroic measures. Cooking is to become (as it ought to be) a dignified service, almost, in fact, a learned profession. The invidious word "cook" is to be discarded; the artists who have hitherto suffered under that designation will henceforth be "kitchen-superintendents," and will have at their disposition aspirants for the *cordon bleu* with the title of "assistant-superintendents." These presiding officers of the kitchen (they are to be "qualified women") will be paid £200 a year, rising to £220, they will have a month's holiday in the year (about double the allowance of the doctor in the wards upstairs), and will be arrayed in a uniform the style and cut of which will probably require consideration as grave as that recently given to the outdoor costume of the registered nurse. "Kitchenmaid" has never had a very gracious sound—it conjures up too graphically visions of Shakespeare's "greasy Jane that keels the pot," and it is now to be replaced by the more euphonious title of "kitchen-assistant," with £55 a year "and all found" attached to it. If by the establishment of a culinary hierarchy, in which "kitchen assistants" may become "assistant-superintendents" and eventually "superintendents," the Asylums Board can solve its difficulties, it will have deserved well of all forms of "institution." Great numbers of clever and competent women, even when they hold a cookery certificate, find it impossible

to earn £200 a year, plus board and lodging, and such terms ought to attract a class which, in addition to being reasonable and contented, can cook a potato, and actually knows when a rice pudding is "done." We understand that in some general hospitals an expert "food adviser" has been appointed, whose duties comprise the choice of an adequate variation of the diets, the collection of the food at the best markets, and supervision of the kitchen staff, with the responsibility for seeing that the food is efficiently cooked, and that it is served to the wards hot and convenient for distribution to the patients.

POOR-LAW HOSPITALS AND TUBERCULOSIS.

REFORM of the Poor-law, although placed in the forefront of the political programme, has not yet taken very definite shape. The Minister of Health announced in Parliament on May 27th that he proposed to begin by transferring administrative functions without altering the present law. Two circulars (607 and 607A), dated July 21st, issued to boards of guardians and municipal councils respectively, indicate one direction in which the Ministry of Health is proposing to secure effective coöperation within the limits of the existing law. There are at present in Poor-law institutions a number of cases of pulmonary tuberculosis at a stage which affords reasonable prospect of arrest of the disease. Such cases would be better in a residential institution run by a local authority under a tuberculosis scheme. To attain this measure of coöperation the Ministry makes the reasonable suggestion to boards of guardians that they should appoint the local tuberculosis officer as consultant at the Poor-law institutions. The guardians would then have the benefit of the clinical services of an officer with personal knowledge of the medical history of the patient. The tuberculosis officer would be requested to examine the patient either before admission or as soon as possible after admission to the Poor-law hospital, with a view to consider whether the case is one for sanatorium treatment. The Ministry goes on to advise boards of guardians, contemplating additional accommodation for tuberculous patients, to consider whether this provision should not be ordinarily undertaken by county and borough councils. Further accommodation for the treatment of non-pulmonary tuberculosis is earnestly commended to the attention of these councils, as well as a proper orthopædic scheme for dealing with the crippling deformities of children. The recommendations of the Ministry, if carried out, will anticipate in one direction the need for Poor-law reform.

THE sudden death occurred last week at the age of 67 of Mr. F. E. Beddard, D.Sc., for many years prosector to the Zoological Society of London. Frank Evers Beddard, who was educated at Harrow and New College, Oxford, made his first mark in science as one of the naturalists who worked out the material collected by the *Challenger* expedition. Many of his contributions to mammalian anatomy were thoroughly original, and he was elected to the Royal Society while quite a young man. He wrote the volume on mammals in the Cambridge Natural History, and several interesting monographs on such subjects as the classification of birds, the geographical distribution of animals, and the natural history of whales. To THE LANCET he sent frequent and illuminating notes on zoology, in which his use of simple language for the description of technical matter was remarkable.

INDEX TO "THE LANCET," VOL. I., 1925.

THE Index and Title-page to Vol. I., 1925, which was completed with the issue of June 27th, will shortly be published. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CXXXII.

THE TREATMENT OF EPIDEMIC DIARRHŒA.

ALTHOUGH the prevalence of infantile diarrhœa in the hot months has been noted for centuries, there is still no common agreement as to its cause. While it is generally accepted that bottle-feeding, heat, and infection all play a part, it is still a matter of dispute whether it is purely a zymotic disease or whether the remaining factors are primary. Probably the majority of cases are due to an extended form of the diarrhœa (usually fermentative) which occurs in infantile dyspepsia and are, therefore, more in the nature of a chemical disturbance of digestion, the rôle of bacteria being only secondary. With the facts so uncertain, it is better, from the practical viewpoint, while taking every precaution to exclude extraneous infection (by milk, dirty utensils, and so forth) to pay equal attention to the composition of the food and, in particular, to the avoidance of mixtures too rich in sugar, especially when combined with much fat. Lately, suspicion has been cast on the whey.

The fact that epidemic diarrhœa is limited to hot weather makes it evident that the effects of a high temperature must be accounted the most important of exciting causes. It is probable that heat not only influences unfavourably the digestion and absorption of food, but also by depressing vitality helps to lower the power of resistance.

The Clinical Picture.

The clinical picture varies according to the severity of the condition. In the milder cases the diarrhœa is accompanied by slight fever without much general disturbance. In the more severe types, of which the "choleraic" represent the extreme, the symptoms lose their purely alimentary character and become widespread. This change is dependent mainly upon loss of fluid and upon toxic absorption. Evidences of this are found in the rapid loss of weight, inelastic skin, pinched features, sunken eyes and depressed fontanelle, rapid feeble pulse, and anuria. Toxic symptoms are chiefly conspicuous in the nervous system in the form of restlessness, drowsiness, and finally coma. Another leading symptom of this class may be "air hunger," evidenced by rapid, deep, and often irregular breathing. In detailing therapeutic measures one would first urge the necessity both of studying the clinical picture as a guide to treatment and of watching these patients from hour to hour, in view of the rapid advance.

There are two distinct phases—the acute one, where the main indication is elimination by stopping all food and evacuating the bowel; and the later one, which the main problem is to find a suitable diet.

The Management of a Case.

1. *General Measures.*—If there is much collapse a mustard bath (at 100° to 105° F.) should be given. After this the child should be put to bed and kept warm in a well-ventilated room or even in the fresh air. The clothing should be light, and scrupulous cleanliness in the child's person should be secured. Napkins must be changed frequently and removed from the room. Excoriation of the buttocks can be prevented by cleanliness and the use of starch and boric powder; in the event of the buttocks becoming sore an efficacious application is lime-water and olive oil in equal parts. The baby should be bathed twice daily with tepid water and the mouth carefully swabbed with cold water.

2. *Elimination.*—If there is abdominal distension with fever and offensive stools, castor oil should be given, or, if this is vomited, calomel gr. ½ may be

tried; but in cases in which the diarrhœa is already profuse further purgation will only do harm. Early irrigation of the colon with normal saline is advisable in all cases as it hastens the effect of the cathartic and removes offensive material. This should be done two to three times a day on the first day and only once a day afterwards, for prolonged treatment of this kind will merely exhaust the child.

3. *Restorative Measures.*—Thorough evacuation, no food, and plenty of water form the essentials of treatment in the first 24 hours. A bottle should be kept filled with half strength normal saline and offered to the baby when awake. Though the degree of recovery by this method alone is often surprising, in most cases further measures are necessary to make good the dehydration. The simplest is the subcutaneous injection of 2 to 3 oz. of normal saline (at temp. 105°) into each side of the abdominal wall, though the amounts should be regulated by the rate of absorption. 5 per cent. glucose is an alternative for infusion.

In urgent cases saline may be injected into the peritoneal cavity, a method which allows of large amounts being given quickly, and of more complete absorption. This is a safe procedure, under aseptic precautions, if care is taken to relieve abdominal distension and to empty the bladder; 6 to 12 oz. at a temperature of 100° may be given in this way, slowly, by the gravity method.

Of stimulants, brandy (℥ 5–10) well diluted, given every one to two hours, is the best. The value of many of the stimulants often advocated is debatable: but if there is acute circulatory collapse with rapid pulse, ℥ 1–2 of 1/1000 adrenalin chloride hypodermically is certainly effective. Camphor in olive oil (gr. ½ to ℥ 5) may be tried in desperate cases.

The injection of 10 to 15 c.cm. of human blood, with the idea of increasing immunity, has seemed beneficial in some cases, but further evidence is required.

4. *Diet.*—All food must be withheld for 12 to 36 hours until the acute symptoms subside, boiled water, weak tea, or weak barley-water being allowed. Starvation at this stage is essential

The next stage, the return to food, presents difficulties. What may suit one case may not suit another, because, as already stated, the causal agents are not always the same. While ideally, perhaps, the mode of treatment should be suggested by the predominant type of organism (proteolytic, fermentative, &c.), this is not a practical proposition. Though no definite rules can be laid down, certain general lines may be indicated. Whatever kind of food is chosen it is important (*a*) to give small feeds at first, (*b*) to make additions slowly, (*c*) to note the effect of increases of food on the temperature, the general condition, and the stools, though it is not always wise to wait for too great an improvement in the latter. Milk is best avoided until the temperature is nearly normal, and, in all cases, when feeding is recommenced, fat is best omitted entirely at first unless albumin milk is used. Some help may be gained from the child's reaction to starvation. If there has been a decided improvement and a fall in temperature, success is often attained on a mainly protein diet, especially in those cases where the stools have been strongly acid. This may be given in the form of skimmed milk, fresh, or perhaps better, dried (such as Cow and Gate or Trufood), added cautiously to the water, giving at first ½ to ½ oz. every second feed and gradually increasing if improvement is maintained. The next step, the stools now being formed, is to add sugar in small amounts. The safest variety of sugar is undoubtedly dextrimaltose, as it tends to ferment less easily than lactose. Finally, a half-cream dried milk or ordinary milk and water mixtures may be embarked upon.

As an alternative albumin milk may be prescribed; in dried form this has proved useful in my hands. Its value lies in the fact that while containing little sugar and whey the protein content is high and lactic acid is added. Whey may be well tolerated after the starvation period, but while satisfactory in milder types, it does not always prove so in the severest ones and is hardly to be recommended as a routine. To cases developing an infective colitis, recognised by the persistence of the temperature and by the continued frequency of the stools which become mucoid and contain blood, it is better to give foods containing little residue, and if skimmed milk does not agree, better results may be obtained by a malted milk or whey with added Benger's food. Fat is badly tolerated and should be ordered with care. Finally, if breast milk is available it may be given on the second or third day, and is superior to any other form of feeding.

5. *Drugs.*—Though they have their use, too much reliance must not be placed on medicines to the exclusion of the more important general measures. Opium is the most valuable, and is specially indicated when the stools are very frequent and there is much pain; it is perhaps of the greatest service in the choleraic cases. It must, however, be used with discrimination, and as a rule should not be prescribed in the early stages before the bowel has been emptied, if there is collapse, or if the motions are small and offensive while the tongue is furred. It may be exhibited as tinct. opii (℥ ½ at six months, ℥ ¾ at one year) four-hourly, or as pulv. ipecac. co. (gr. ½ at three months, gr. ½ at six months) six-hourly.

After the initial stages when the diarrhœa is less but still persistent, small six-hourly doses of castor oil are valuable (ol. ric. ℥i. with mucilage). Another plan is to alternate this mixture with a combination of hyd. c. cret. and pulv. ipecac. co., a dose of each being given three times a day. Bismuth, if ordered in large doses (gr. 5 to 20 from a few weeks to a year old), may be effective, especially when the large bowel is affected.

Special Symptoms.

Persistent Vomiting.—After a preliminary wash-out of the stomach with a weak sod. bicarbonate solution vomiting is, in many cases, controlled merely by reducing the feeds in size. If even small sips of water are rejected, feeding by mouth must be stopped and recourse had to saline injections to supply the necessary fluid. Drugs are of little value with the exception of morphia, which may be given hypodermically (gr. 1/100 at three months) in urgent cases when other methods have failed.

Hyperpyrexia.—A persistently high temperature (105° F.) should be relieved either by tepid sponging or by the application of a cool pack. This latter method helps to control not only the high temperature but also the nervous symptoms which accompany it. If restlessness is extreme sedatives may be given.

Ketosis.—Where there is clinical evidence of this state (stupor, air-hunger, acetonuria) it is best treated by giving plenty of fluid and, specifically, 5 per cent. dextrose solution (intravenously), which provides a more rational and safer treatment than alkalies.

Tenesmus.—This is best relieved by rectal irrigation with warm saline, combined, if need be, with doses of silver nitrate (gr. 1/12 to 1/6) or opium by mouth.

Prophylaxis.

The comparative immunity of the breast-fed is a testimony to the importance of breast-feeding, and if a child is on the breast it is unwise to wean during hot weather. Babies who have had previous dyspeptic disorder so readily fall victims to the disease that great care should be taken to see that prescribed mixtures are rational ones, and that upon the slightest sign of indigestion immediate steps are taken to correct this and to modify the feeds to suit hot-weather needs. Over-feeding by giving excess of milk, instead of added water, to satisfy thirst must be guarded against. The food should be prepared with care, fresh milk should be boiled, and if not beyond suspicion should be replaced by a dried milk. Attention to the details of the nursing care and hygiene of the child and his protection against the excessive heat by light clothing and adequate ventilation of the rooms contribute not only to his comfort, but also to the prevention of what may prove a serious disease.

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Special Articles.

SOME GENERAL REFLECTIONS ON PUBLIC HEALTH ADMINISTRATION.

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II.—THE MEDICAL PRACTITIONER AND PUBLIC HEALTH.*

IN that magnificent statement—"An Outline of the Practice of Preventive Medicine" (1919)—Sir George Newman embodies "the law and the prophets" of preventive medicine. In his summary of the present status and future prospects of preventive medicine he says:—

"It is clear that such a policy as that which is here outlined calls for an adequate medical service and the appropriate administrative machinery. The foundation of a medical service is the medical practitioner. He is its pivot, its anchor, its instrument. If he is competent it has the first surety of success; if he is ineffective or ill-equipped it must fail" (pp. 100–101),

and he also quotes the Editor of THE LANCET as saying:—

"The prevention of disease is as much the rôle of the practitioner as is the cure and care of patients."

About the same period the present writer, addressing the Australasian Medical Congress said:—

"The medical practitioner cannot escape his responsibility to the nation. He has the knowledge, or is, at least, in the best position to acquire the knowledge; he has the patient under his hand from first to last; he has the confidence of the patient and his friends; and, of all conceivable agents, he is in the best position to apply effective measures of preventive medicine. He must accept his responsibility and must accustom himself to a state of mind in which he would feel the same shame at a secondary case of infectious disease in a family amongst his patients as he would at sepsis after an operation. The aseptic conscience must be sensitive to all forms of preventable disease, not merely those due to errors in surgical technique."

The General Medical Council of Great Britain has recently revised the medical curriculum in the interests of the

"ever-widening subject of preventive medicine. The Council recommends that the subject should be a pervading influence all through the curriculum, affecting every subject in it, so that the student naturally and almost unconsciously adopts in his daily practice of medicine the attitude and spirit of prevention."

If the importance of the general practitioner is so great that "if he is ineffective public health must fail," the first inquiry that must be made is what actual steps have been taken by either the national governmental authorities or the elected governing directorate of the medical profession to ensure that the general practitioner is worthy of his high calling and that he is sufficiently well-trained, well-organised, and well-supported to be effective. It can be said at once that in neither the United Kingdom, the United States, nor Australasia has a complete organisation been developed which makes full use of the general body of the profession or gives in any way a satisfactory plan for the transferring of the edifice of public health to its proper "foundation"—the medical practitioner. There is no doubt as to the necessity for devising such a plan, and it is interesting to review certain attempts which have been or are being made towards this end.

The State of Alabama, U.S.A.

Perhaps the most striking, certainly the most interesting, although not the most valuable, attempt to attain this end is found in the legal code of statutes of the State of Alabama. The basic organisation of the State public health system is found in the following extracts from the Health Laws:—

"The Medical Association of the State of Alabama is the State Board of Health. The State Board of Censors of said Association shall be known as the State Committee of Public Health. The boards of censors of county medical societies in affiliation with the Medical Association of the State of Alabama shall be known as county boards of health of their respective counties, including all incorporated municipalities therein, and shall be under the general supervision and control of the State Board of Health."

The actual status in practice of this arrangement is best indicated by the preface to the "Public Health and Medical Laws of Alabama" (1920 edition), written by Dr. S. W. Welch, State health officer.

"The State of Alabama has been magnanimous in a legislative way to her medical profession. Perhaps in no other Government of the world has a like spirit of confidence in, and generosity to, her medical men been crystallised into law."

In support of this declaration the following examples are given:—

1. The State has wholly and entirely entrusted to her organised medical men the right of deciding who shall be admitted to their ranks, thus enabling them to elevate the standard of qualification of the practitioners of medicine in the State to such plane as they may desire, thereby protecting the people against the evils of ignorance, quackery, and dishonesty.
2. She has provided that her health boards—State and county—shall consist of medical men exclusively, and endowed these boards with the important legal function of administering the health laws and regulations of the State, the counties, and the incorporated cities and towns.
3. She has confided to the organised profession the right of naming all medical health officials—State, county, and city—and by doing so has not only placed the selection of these officials in the hands of those most competent to judge as to their fitness, but has thereby widely divorced her public health system from politics and from commercial influence.
4. She has provided her medical men, not only with the privilege, but with the right of practically applying through their organised bodies, State and county, whatever sanitary knowledge they may acquire to the prevention of disease and to the protection of the health and lives of the people.

"It is hoped that every member of the profession in the State will avail himself of the opportunity which this pamphlet affords of getting full information as to the medical laws of the State. When that has been done, the close coördination between the scheme of organisation of the profession and the public health system and laws of the State will be obvious. Then every member of the profession in the State will know his duty, and knowing, should stand ready to discharge it faithfully and conscientiously."

That the control of the Medical Association over the administration is complete is illustrated in the case of county medical officers of health:—

"No county health officer-elect shall assume office until his election shall have been approved by the State Committee of Public Health."

The Medical Association, as is indicated in the quotation above, has power of issue of certificates to practise medicine—i.e., it is not only a registration body but an examining and qualifying body.

"The Board of Censors of the Medical Association of the State of Alabama is constituted a State Board of Medical Examiners."

One passage in the "Law Regulating the Practice of Medicine" reads as follows:—

"The State Board of Medical Examiners may revoke a physician's certificate of qualification to practise medicine for any of the following: . . . (3) Being guilty of unprofessional conduct of a character likely to deceive, defraud or injure the public in matters pertaining to health."

As might be expected under the circumstances the law preventing the treatment of diseases of human beings by any system of treatment whatsoever by any person who has not obtained a certificate of qualification from the State Board of Medical Examiners is very precise and very rigid. On the other hand, it has been thought wise by the legislature to create special administrative bodies—e.g., the Alabama Tuberculosis Commission, the Child Welfare Department, independent of the State Board of Health

* Part I. appeared in THE LANCET of July 11th, and Parts III. and IV. will be given in subsequent issues.

and with separate statutory powers, while the regulation of the employment of minors in industry is confided to the State prison inspector.

While the purpose and the intention of this legislation appear to have arisen from an early realisation of the proper place of the medical practitioner in the public health machine, yet, in my opinion, the results obtained by this procedure have not been such as to justify the substitution for the recognised democratic manner of Government control of a system in which Government delegates its functions and its authority to a private organisation. Moreover, in practical working, many minor departures from the original idea have been introduced, until now the system actually in operation does not in practical detail differ much from the ordinary working of a Government department.

Dr. Chapin, the veteran Health Commissioner of Providence, comments thus on this method :—

"One plan to avoid political entanglements, which has been tried in several States, is to give the medical societies a share in the management of the health department. It is dangerous and unwise to give to non-representative bodies a share in the Government. Moreover, medical men as a body are not skilled in preventive medicine. Only great benefits, not to be otherwise secured, would warrant such a delegation of authority. It must be remembered that medical politics and medical log-rolling are at times as pernicious as any other form of partisanship."

The American Medical Association has fully acknowledged as its duty the encouragement of public health ideals amongst its members, and the dissemination of important information not only to its members but to the general public. Dr. Frederick Green, the secretary of the Council on Health and Public Instruction of the American Medical Association, laid down the position in 1914 as follows :—

"There is to-day serious need of an increased appreciation of the social responsibilities of the medical profession. As these are largely responsibilities of physicians in the aggregate rather than as individuals, it is important that they should be discussed in medical organisations and should become the basis of intelligent action. . . . Since the relation of physicians to the public cannot be that of dictators or rulers, and since the power for restriction and regulation must always lie in the will of the majority, there remains only a single relation which physicians as a class can maintain towards the general public—namely, that of teachers."

These are extracts only from an informative article, but they serve to indicate the basis of the present policy of the American Medical Association—viz., a collective rather than an individual responsibility, and an educational rather than a political policy. In the interpretation of these ideas the American Medical Association has rendered most important service—e.g., in the exposure of pseudo-therapeutic frauds, of quasi-medical impostures, the publication of much public health literature in the form of reprints and pamphlets, and most recently the publication of a popular journal, *Hygeia*, of a high order of excellence.

Australia.

In Australia there has been an interesting series of steps towards the realisation of the ideal inclusion of the general practitioner as a working organic element in the public health system. At the time of the influenza pandemic the Commonwealth Health Department summoned a conference of representatives of the State Departments of Health and representatives of the State branches of the British Medical Association. This was a new departure from established practice, as these conferences had previously consisted of officials only. In 1921, when plague appeared in Brisbane, this precedent was followed and a similar conference summoned. In 1922, at a conference on venereal disease control, the same constitution was adopted. In this way the importance of the practising profession in all public health matters was acknowledged and has been definitely established.

When, in 1921, the Commonwealth Department of Health was created, it was considered important to maintain regular contact with the organised profession, and the suggestion was made that the Commonwealth Director-General of Health might attend and an unofficial talk might be held with the Federal Committee of the branches of the British Medical Association in Australia on the occasion of each of its meetings, held every six months. These talks, informal and perhaps inconclusive, have continued until now; and, while there is little to show of a tangible kind, there is much to cause satisfaction in two directions. The much closer association developing between the official departments and the controlling body of the medical profession offers promise of a practical expression to the acknowledged community of interest. In addition, there has been close consideration by the profession of the individual responsibility and opportunity of training physicians in matters of public health administration and possible reform; as a result the following has been adopted by the Federal Committee of the British Medical Association in Australia for the consideration of the whole profession :—

"In no State is the service of the practising practitioner officially utilised for the prevention of diseases to any degree consistent with his knowledge and opportunity. Any scheme to rectify existing conditions (in respect of public health generally) must have as its immediate ideal . . . the linking up of the general practitioner into active participation in the administrative scheme and the steady inculcation of the ideal of prevention rather than of carrying out regulations, into both the actively administrative and actively practising members of the profession. On the medical side the unit is the medical practitioner, whether in general or special practice or acting as medical officer to industrial or school organisations or to institutions. In addition to the treatment of his patients he should—

"(i) Notify to his district health officer on prescribed forms: (*a*) All birth, stillbirths, and miscarriages. Objection has been taken to this suggestion on the grounds that it would be impossible to secure notification of miscarriages in single women. The force of this objection is recognised. If it is so strong that notification of miscarriages would be a dead letter, it had better be dropped. On the other hand, it must be recognised that the notification proposed is to a medical not lay authority and that if the medical profession is to take its share in the lessening of criminal abortion, some such step will ultimately be necessary. Confidential notification of miscarriages by married women would frequently lead to the institution of treatment for otherwise overlooked maternal syphilis. Notification of stillbirths to the district medical officer would have the same effect. Notification of births to such authority would be of great value statistically and would assist in infant welfare objects. (*b*) All deaths. At present the death certificate is given to the relatives or undertaker and is largely formal. This practice would continue for burial purposes, but in addition a confidential notification to be made to the medical officer, as is at present done in Switzerland, could often show the relation of the cause of death to a previous infection in a way that is impossible now. This would afford more accurate statistical information and would make available a mass of information that is at present unutilised for public health purposes. The need is so greatly felt that some States already have a private arrangement between the principal medical officer of the State and the registrar of deaths, by which the latter forwards to the former copies of certificates relating to deaths from infectious causes. The present suggestion would gain the same object in a much more direct and far-reaching way. (*c*) All cases of communicable disease prescribed by the regulations. (*d*) All cases of mineral (lead, &c.) or organic (alcohol, &c.) poisoning.

"(ii) Order in writing prescribed methods of concurrent and terminal disinfection in infectious cases. The methods would be prescribed by the State health authorities (with the conference of State health authorities suggested later in the scheme these would soon become uniform in different States). The prescribed methods would be printed on different forms for different diseases. The practitioner would only need to sign one of these and hand to householder just as quarantine officers in different ports now hand fumigation orders to captains of vessels which require fumigation.

"(iii) Carry out the prescribed methods for the prevention of the spread of infection by contacts or carriers—i.e., throat swabs, collection of urinary and fæcal specimens, &c. At present some of these are done by nursing or sanitary inspectors. It would be far quicker and more efficient for them to be done by the practitioner seeing and treating the case.

"(iv) Examine school-children in particular districts by arrangement with the district health officer and education authorities. Such a provision would chiefly apply to country schools and might occur with regard to a particular threatened epidemic or with regard to physical examination of school. It would afford opportunity of coöperation of educational and health authorities in special cases.

"(v) Carry out other health duties as prescribed from time to time by regulations or as requested by district health officer. The objection has been raised that such a proposal puts the practitioner too much under the control of the district health officer. It must be remembered that in the discussion of a general scheme, some such clause must be inserted, to leave room for possible developments beyond the instances above cited. The term 'requested' as opposed to 'prescribed' is used to emphasise the fact that mutual coöperation between district health officer and practitioner is requisite to the scheme, rather than the purely formal carrying out of legal enactments.

"*Note.*—For all such services rendered the practitioner will receive fees prescribed by regulation. There would thus be an incentive to him to increase his activities; the more interest he showed in preventive measures, the more his remuneration; part-time medical officers would be abolished; all men in practice would be on the same level in relation to departmental administration."

If this proposal be adopted it will be a new move in public health progress. The enrolment of the private practitioner in the public health army is by no means a new idea, but the idea of making him the medical officer of health to his own patients will be a new move even if it is not a new idea.

Qualifications to these Proposals.

The present writer, giving evidence before the Royal Commission on National Health Insurance, after dealing with the above proposals, made the following qualifications:—

"All experience shows that modern preventive medicine is ignoring the general medical practitioner to its own disadvantage, and that it is now essential for the success of preventive medicine that all practising physicians should become actively engaged in the official campaign against the occurrence of disease and death. It is, however, necessary that: (1) The practitioner shall not be expected to undertake any duties which are not on the lines of his daily medical work; (2) the practitioner shall be adequately paid for all work done; (3) the practitioner shall be prepared to accept freely both advice and direction from trained public health officials on matters outside the range of his own experience or within the range of official necessities; (4) the practitioner should be prepared to accept discipline in professional matters relating to public health from an official body of his professional colleagues in place of the police court discipline now provided by various statutes.

"There is one phase of the relationship between the medical practitioner and any administrative organisation which requires consideration. It is an important item in the unwritten code of medical etiquette that a diagnosis declared to a patient by the doctor shall not be questioned in the presence of the patient and shall not be lightly altered even by a senior consultant. While the presumption of infallibility may in the past have been an important adjunct to the doctor's treatment, the general state of public enlightenment renders this now unnecessary and the attitude of the profession in relation to the sanctity of the original diagnosis as a matter of ethics might well be revised. Another related matter is the practice of some doctors of giving the patient a wide margin of benefit in the issuing of medical certificates for official purposes. It is very desirable that medical certificates of sickness or disability should be more reliable than they now are in many cases."

Here, then, on the one hand, is the idea, already widely accepted and frequently reiterated—the correlation of the medical practitioner with public health administration. On the other hand are three different types of practical expression of this idea. In Alabama the whole responsibility for public health administration was originally entrusted to the organised profession. The American Medical Association is doing much in developing a policy of intelligent collective action in public health work, but has not taken, as an association, any defined place in the public health scheme. The Federal Committee of the British Medical Association in Australia is working towards the objective of making the whole army of medical men in the country the fighting force in the public health campaign. This will have—if successful—several good results. It will increase the interest of every medical practitioner in the prevention of disease; it will compel the public health specialist to supply reliable information which means that he must know his subject thoroughly; it will give to the departmental authorities a solid backing of support which will enable them in their turn to compel attention, respect and, most important, funds, from Parliament and Government.

The administrative interpretation of the principles of public health in practical form as one of the functions of Government can hardly be considered a legitimate field for the organised association of the practising profession or even for its members individually. The devotion of part of the resources of the collective profession to the education of doctors and public in the principles and technique of public health is a legitimate and most valuable form of auxiliary enterprise, but it does not utilise to the full the great potential striking value of the medical army. This can only be achieved by enlisting that army as voluntary members and training them to coherent action with uniform and intelligent inspiration—the training, inspiration, and direction being supplied by a headquarters staff of trained specialists in which the whole army has full confidence.

Whether any one of these modes, or something quite different, is ultimately found to be the best, all are agreed with Sir George Newman that "an adequate medical service must seek to fulfil and conjoin all the varied elements of a national health policy, environmental and personal. There must be no divorce between the epidemiologist and the practitioner."

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are some of the health statistics for 1924 of a group, including four metropolitan boroughs and the county borough of West Ham:—

Name of borough.	Mid-year population (R.G.).	Birth-rate.	Death-rates per 1000 of the population.				Death-rates per 1000 births.		
			All causes.	Tuberculosis.	Cancer.	Resp. diseases with influenza.	Neonatal mortality.	Infant mortality.	Maternal mort. from childbirth.
Kensington ..	178,700	16·2	13·0	0·83	1·6	3·2	25	75	1·7
Poplar	167,300	22·9	12·1	1·20	1·3	3·5	27	72	1·3
Westminster ..	139,900	11·6	11·8	0·99	1·5	3·0	27	59	3·1
Stoke Newington	52,920	16·6	11·3	0·85	1·4	2·2	27	58	2·3
West Ham ..	317,400	22·7	11·5	1·19	1·3	3·2	—	78	1·7

Kensington.

Dr. James Fenton reports several "bests on record" for 1924. These include the death-rate from tuberculosis, the infant death-rate from enteritis, the maternal mortality-rate, and the death-rate among illegitimate infants. The majority of the inhabitants of North Kensington are poor people, whilst in South Kensington such persons constitute only a small portion of the population. This fact is reflected in the birth-rate of 21·7 for North Kensington and 9·2 for South Kensington. During the year the council took successful proceedings against a medical practitioner for failing to notify a birth.

One of the most difficult of the housing problems in Kensington is the sanitary control of houses let in lodgings. There are 5690 tenement houses—i.e.,

houses let to more than one family without being specially adapted for the purpose. Of these 2901 are on the register of houses let in lodgings. About 55,000 persons occupy these houses. Worse than these are the houses let in so-called furnished rooms, and Dr. Fenton records with satisfaction the gradual diminution of these latter. Thus, in 1912, there were 187, and at the end of 1924 there were 83. A table is given in which the infant mortality-rates in the tenement houses and mews dwellings are compared. There are 2091 mews dwellings in the borough. The annual figures are small and have to be used with caution. The infant mortality in private houses was 43 in North Kensington, 61 in South Kensington. The infant mortality in tenement houses was 90 in North Kensington, 47 in South Kensington. The infant mortality in mews dwellings was 72 in North Kensington, 41 in South Kensington. During the last three years there has not been a single death from enteritis in the South Kensington mews dwellings, the majority of which are over garages instead of stables. During 1924 there were also no infant deaths from enteritis in North Kensington mews dwellings, in the case of which only a few of the stables have been converted into garages. The good results as regards enteritis in 1924 are attributed by Dr. Fenton mainly to the cold and rainy summer. Before any conclusions are arrived at as to the effect of housing conditions upon infant mortality, "consideration," says Dr. Fenton, "must be given to the fact that negligent, careless, ignorant, and poverty-stricken parents generally drift into the worst type of tenement house and mews dwelling." Infants in the better-class homes are not visited by the health visitors. During 1924 these "above-standard" births number 768, with 19 deaths, giving an infant mortality of 24. This is to be compared with an infant mortality of 93 for the remaining infants.

A table shows that the decline in the mortality of illegitimate infants has been very marked in recent years. Thus, during the period 1911 to 1921, the infant mortality of illegitimate children was much more than double that of the legitimate, while in 1922, 1923, and 1924 the rate for illegitimate children was 135, 127, and 97 respectively, as compared with 82, 70, and 75 for all infants. Antenatal work continues to make progress. Thus, for 2140 births coming within the scope of the council's scheme, there were 1199 expectant mothers who attended the antenatal clinics of the Queen Charlotte's Nurses' Home and the infant welfare centres.

Poplar.

Dr. F. W. Alexander's thirty-second annual report includes those of the chief health visitor, the senior medical officer of the Royal College of St. Catherine (Dr. H. K. Waller), and the council's dental surgeon. Artificial sunlight has been administered to a number of children and the results are so encouraging that permanent accommodation is being obtained for its much more extensive use. A permanent building is also to be erected for the installation of extended plant for the manufacture of electrolytic disinfectant fluid. There is an increasing demand for this disinfectant, and it is in regular use for the three swimming-baths. The arrangements with the Seamen's Hospital, Greenwich, for carrying out bacteriological examinations (other than tubercle) continues to be satisfactory. Plans are being prepared for an up-to-date maternity and child welfare clinic in High-street, Poplar, and also for the erection of observation wards. Provision will be made for a dental clinic and for artificial light treatment.

Dr. W. C. P. Smith, the tuberculosis officer, reports that the new premises for the dispensary, Wellington-road, Bow, have now been in use for a full year and that they have given every satisfaction. The comparatively quiet surroundings are much appreciated after the turmoil of the main road. The question of a branch dispensary in High-street, Poplar, is still under consideration. Cases of lupus are given Finsen light treatment at the London Hospital. The council pays a charge of 5*s.* per application. Seventeen cases received 440 applications during the year.

Dr. Waller, in his report, gives an account of a case which illustrates some of the disadvantages of institutional treatment of an infant suffering from malnutrition. The history of the baby was something as follows. It was born in a lying-in hospital and its weight was inaccurately registered at 9 lb. As it only weighed 7 lb. 10 oz. on the seventh day it was taken to the out-patient department of a children's hospital at a distance and breast-feeding was replaced by artificial feeding. It did not thrive, however, and was admitted into a Poor-law hospital on the fifteenth week where it improved rapidly up to the twenty-second week. For the next seven weeks it lost weight as an in-patient of a convalescent home. For the next five weeks its weight remained stationary at a resident childrens' nursery. At 35 weeks it was brought to the centre and weighed 11 lb. Its dieting and management with the help of the health visitor was found to be a simple matter. The visitor encouraged the distracted mother. The improvement was uninterrupted, and at 52 weeks the baby's weight was 20 lb. Dr. Waller emphasises the need for accurate weighing at birth and the importance of the health visitor's work in the home.

Westminster.

Dr. Francis J. Allan, in his farewell report, gives an interesting contrast of conditions and death-rates in the city of Westminster when it was re-incorporated 25 years ago and at the present time. At the former period the large slum areas north of the Strand with a density in parts of 900 to 1200 persons per acre was being dealt with. Underground habitations were common. The law is now more stringent and in 1924 only seven instances of infringement were discovered. In the earlier period the water-supply of houses was restricted and seldom carried above the ground floor. The abolition of the system of an extra charge for water laid on to upper floors helped matters. Now every tenement house has water on each floor. Refuse was only collected weekly or fortnightly, and this with the restricted water-supply inevitably led to a high infant mortality from diarrhœa. In 1903 the Westminster Health Society was inaugurated and has been active ever since. Needless to say, there have been great improvements in the death-rates. The male death-rate from all causes has declined from 16·5 in the first quinquennium of the century to 11·4 in 1921–24; the female from 12·5 to 9·6; and the infant mortality from the neighbourhood of 120 to an average of slightly over 50 for the last three years. The death-rate among children between the ages of 1 and 5 has been halved, while the death-rate among children from 5 to 15, always low, has remained practically constant throughout the whole period. There is little change in the death-rate of infants in the first week of life, but a marked improvement in the neonatal mortality. Amongst other matters mentioned by Dr. Allan is the improvement in the tailoring and dressmaking workshops in the northern areas. Better ventilation has been secured and the Gas Light and Coke Company have coöperated in providing proper methods for carrying off fumes.

Stoke Newington.

Dr. Henry Kenwood would like to see provision made for dental treatment in connexion with the maternity and child welfare scheme. Owing to the risk from small-pox two small shelter flats have been provided for the temporary accommodation of families during the disinfection of their houses. There appears to be a prejudice on the part of the public against occupying these shelters unless the circumstances indicate grave danger. Dr. Kenwood evidently thinks they might be used with advantage in cases other than small-pox. The tuberculosis officer (Dr. L. U. Young) says there is no apparent improvement in the housing conditions of the area served by the dispensary. General practitioners are sending up new cases to the dispensary in increasing numbers.

The children attending Stormont House School have responded well to open-air treatment. The Invalid Children's Aid Association have been instrumental in obtaining accommodation at convalescent homes for delicate and tuberculous children, but the need for a local home for advanced and urgent cases of tuberculosis still exists. Dr. Sophia Jackson-Smith (maternity and child welfare officer) says very few babies suffer from malnutrition but a large number from overfeeding and too frequent feeding. Education in food values is needed, she says, and the older girls should be taught cookery in a practical manner. Very few parents are unable to provide suitable clothing, but nevertheless many children suffer from unsuitable clothes. The toddlers do not get enough sleep. Antenatal work makes progress. Two women gave birth for the first time to living babies, one after three and the other after four stillbirths. More houses are needed, not on account of the industrial development of Stoke Newington, but to cope with overcrowding. Dr. Kenwood complains of the failure of the scavengers to keep the refuse carts covered with the tarpaulins provided for the purpose.

West Ham.

Dr. F. G. Collins only took up his duties last September. Thirty-one cases of encephalitis lethargica were notified, in three of which the diagnosis was not confirmed. One death of an infant girl occurred; eight of the 28 cases appear to have made a complete recovery. The remainder are under treatment suffering from various nervous symptoms and debility. As the introduction to a propaganda campaign, a Christmas card from the West Ham Council was distributed to each of the scholars in the elementary schools with the headline "Health is better than Wealth," and nine health maxims inside.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 11TH, 1925.

Notifications.—The following cases of infectious disease were notified during the week, namely:—Small-pox, 88; scarlet fever, 1635; diphtheria 896; enteric fever, 49; pneumonia, 775; puerperal fever, 61; cerebro-spinal fever, 11; acute poliomyelitis, 8; encephalitis lethargica, 52; dysentery, 4; ophthalmia neonatorum, 133. There were no cases of cholera, plague, or typhus fever notified during the week.

Deaths.—In the aggregate of great towns, including London, there were 2 deaths from enteric fever, 35 from measles, 63 from whooping-cough, 9 from scarlet fever, 25 from diphtheria, and 13 from influenza. In London itself there were no deaths from influenza; deaths from diphtheria numbered 7, from whooping-cough 15.

NO TAX ON TOURISTS IN FRANCE.—The French Parliament has fixed at 68 francs (10 francs for students and workers) the cost of the identity card which must be obtained by foreigners staying in France for a period exceeding two months. The card once obtained will be valid for two years. The Office National du Tourisme may take some credit for the preferential treatment thus accorded to bona-fide tourists.

ASSOCIATION STOMATOLOGIQUE INTERNATIONALE.—At a meeting to be held at 11, Chandos-street, London, W., on Monday, July 27th, at 8.30 P.M., the following societies will be represented: Royal Society of Medicine, Section of Odontology; British Dental Association; Public Dental Service Association; and the Incorporated Dental Society. The chair will be taken by Mr. A. Templar Barritt, L.D.S., dental surgeon to the French Hospital. After an address of welcome by Sir W. Arbuthnot Lane, papers will be read on the following subjects: Public Dental Service in England, by Mr. J. Clifford Wing, L.D.S. Professional Education of Medical Specialists in the British Isles (Stomatologists and Dentists), by Mr. J. Lewin Payne, M.R.C.S., L.D.S. Stomatology, Public Health, and the Qualifications for Specialists in Medicine in 1925 in Relation to International Social Problems, by Mr. Alfred J. Asgis, D.D.S., clinical professor of stomatology, New York Polyclinic Medical School. National Health Insurance (Dental Phase), by Mr. Fred. Butterfield, secretary of the Incorporated Dental Society and member of the Dental Board of the United Kingdom. The President of this Association is Dr. Chompret at 182 rue de Rivoli, Paris.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING AT BATH.

THE ninety-third annual meeting of the British Medical Association opened at Bath on July 17th, when the Representative Body met at 10 A.M. in the Grand Concert Hall of the Pump Room. Dr. H. B. Brackenbury occupied the chair.

Municipal Welcome.

During the course of the morning the Mayor of Bath, Alderman Cedric Chivers, J.P., visited the meeting to convey a welcome to the Association. He said that this gathering was, perhaps, the most important and certainly the largest company that had ever honoured the city with its presence; the bells of the Abbey had been rung in welcome, and he was glad to have an opportunity to recognise publicly the great service and vital value of the medical profession to civilisation. There was no need to extol the beauties of the city and locality; his task was to offer the fullest hospitality to the meeting, an offer bounded only by the space and material at the disposal of the municipal authorities. Dr. Brackenbury, in reply, said that the Association had looked forward for years with peculiar pleasure to this visit to a historic and beautiful city renowned for those principles of health and education for which the medical profession stood.

REPRESENTATIVE MEETING.

FRIDAY, JULY 17TH.

After the usual formal business the meeting passed a vote of deep regret and condolence with the President, Dr. F. G. Thomson, who was prevented by illness from taking his place at the gatherings. Mr. C. P. Childe was elected a vice-president of the Association, in recognition of his services as President 1923–24, and Mr. R. G. Hogarth of Nottingham was elected President for 1926–27. In 1927, the year of the Lister Centenary, the Association will meet in Edinburgh. Mr. F. G. Hallett was elected an honorary member in gratitude for his valuable services, particularly in connexion with the preparation of the Roll of Honour. The affiliation with the Canadian Medical Association was celebrated by the election of two of the Canadian delegates as Vice-Presidents: Dr. A. Primrose, Dean of the Medical Faculty in Toronto and chairman of Council, C.M.A., and Dr. F. N. G. Starr, honorary secretary of the Annual Meeting, 1906. At an extraordinary general meeting held in the afternoon the articles of the Association were duly amended to allow of the affiliation.

In moving the adoption of the annual report of Council, Dr. R. A. Bolam referred to the serious losses in personnel suffered by the Association during the year, particularly that of Dr. Haslip, the ex-treasurer, the fruit of whose wise judgment they continued to reap. He referred to the new "Sir Charles Hastings Fund," established through the generosity of a member of Council to form a reservoir from which urgent needs experienced by members of the Association might be relieved without undue formality.

The New House.

In approving the report of Council under the heading "New House of the Association," the Chairman referred to the award of the gold medal of the Association to Dr. Bolam, who responded to prolonged applause by expressing his deep appreciation of the honour done to him and his vision of the new house as rallying point for members in the Kingdom and the Empire, and a focus of activity which should be of the greatest value to the profession and the State. He urged those to come not to be afraid of undertaking heavy responsibilities and carrying out the larger plans for the headquarters, but to look with a generous eye to the future.

The Representative Body then placed on record its deep appreciation of the services rendered in connexion

with the selection, preparation, and opening of the new house in Tavistock-square. The resolution is to be framed and hung in a suitable place within the house.

Dr. Bolam, in acknowledging these motions and the congratulatory speeches of Sir Jenner Verrall and Dr. J. A. Macdonald, said that it was largely a question of time and place and circumstance that any one man should be on the spot and be able to do the service necessary. He paid a tribute to the special and well-nigh indispensable qualities and knowledge of the financial secretary, Mr. L. Ferris Scott. It had been astounding and most gratifying to see the devotion of all officials, senior and junior, to the work of the Association during the trying period of stress, and the Association might well feel proud of the spirit animating all its workers.

Financial Position.

Mr. N. Bishop Harman, the treasurer, in moving the adoption of the financial report, pointed out that there was a surplus of over £8000 obtained on a record expenditure of £113,917. The forecast for the year 1924, published in the annual report of Council for 1923–24, showed an estimated surplus for the year of £5500; the actual surplus realised as shown by the books was £8923, a result accounted for almost equally by increases over the estimates in the revenues from subscriptions and advertisements.

A New Journal of Pædiatrics.

Dr. J. A. Macdonald, chairman of the Journal Committee, reported a very successful year, and announced that the Committee proposed to found a subsidiary journal of children's diseases to publish certain articles on this subject that were not suitable for the general paper, but could find no adequate place in any existing journal. It was hoped that the publication, a monthly one, would be self-supporting, and the principle might subsequently be extended.

Research Scholars.

Dr. C. O. Hawthorne, in submitting the report of the Science Committee, said that the Association might well congratulate itself on the work accomplished by its scholars. In particular the holder of the Ernest Hart Memorial Scholarship, Dr. A. J. Copeland, had succeeded in finding a new local anæsthetic with all the virtues and none of the perils of cocaine. The Committee was much indebted to the specialists who inspected the work of these scholars, and reported on them, and also to those who acted as judges in the award of prizes. The library was being increasingly used by members.

Mr. H. S. Souttar added his congratulations on the work of the research scholars, and pointed out that one of them, Dr. H. W. Cairns, had obtained a Hunterian professorship at the Royal College of Surgeons of England as a result of his work whilst holding a B.M.A. grant.

Mr. E. B. Turner said that the grant allowed for scientific work was much too small.

Standards of Remuneration for Teachers and Research Workers.

Dr. Hawthorne mentioned two projects not yet ready for discussion by the Representative Body, viz.:—

1. The establishment of a standard of remuneration for laboratory and research workers to the effect: Proposed that whole-time (*a*) non-professorial medical teachers, and (*b*) medically qualified laboratory or research workers, should be grouped into three grades as defined below, and with the salaries as stated:—

Grade III.—Comprising those who are junior workers temporarily employed on probation; no person shall remain in Grade III. for more than three years. That the minimum salaries for Grade III. shall be as follows: First year, £300; second year, £350; third year, £500.

Grade II.—Comprising laboratory or research workers or teachers who have had experience in Grade III. or in work of a similar character, and who are permanently and exclusively employed as such.

Grade I.—Comprising those of Grade II. whose qualifications or duties justify a position of seniority in status and a higher remuneration. That the minimum salary for Grade I. shall be £750 per annum; that after the probationary period (i.e., Grade III.) has been completed, dismissal should be possible only on grounds of neglect of duty, improper conduct, or incapacity.

Proposed that non-professorial medical teachers and medically qualified laboratory or research workers holding part-time appointments should receive remuneration, for the time engaged, at the rate of not less than £600 per annum.

A Book of Remedies.

2. The publication of a book describing the nature and quality of new and non-official medicines, similar to that published by the American Medical Association. The object which the A.M.A. has in view in publishing its book is to disseminate information among members of the profession in the United States relative to new and non-official medicines and medicinal preparations. For admission to the book any one of these must comply with the rules of the A.M.A. which prescribe, inter alia (i.) that the composition of all articles must be declared; (ii.) that generally speaking articles advertised to the public will not be accepted; and (iii.) that an article will not be accepted concerning which the manufacturer makes unwarranted, exaggerated, or misleading statements. The Council understands that the activities of the A.M.A. in this direction meet a real need on the part of the profession in the United States.

These proposals will come before the Representative Body next year. Dr. Hawthorne urged members to consider whether such a publication were necessary or advisable, if so, whether it were a suitable activity for the Association and whether it were a justifiable expenditure.

Oblique Advertising.

The chairman of the Ethical Committee, Dr. R. Langdon Down, presented the reconsidered recommendations as to oblique advertising which the Committee hoped would provide a compromise satisfactory to the press and the profession. The report recommends that practitioners who desire to discuss in the lay papers matters relating both to medical science and policy and to the health and welfare of the public should make it a condition of publication that laudatory editorial comments or headlines relating either to the contributor's professional status or experience shall not be permitted; that his address or photograph shall not be published; and that there shall be no unnecessary display of his medical qualifications and appointments. There is a special claim that practitioners of established position and authority shall observe these conditions, for their example must necessarily influence the action of their less recognised colleagues. Discussions in the lay press on disputed points of pathology or treatment should be avoided by practitioners; such issues find their appropriate opportunity in the professional societies and the medical journals. The report goes on to say:—

"After making all allowances for all those modes of publicity for which there may be some justification, there remain many instances which can only be regarded as gravely and unnecessarily contravening the spirit of the notice of the G.M.C. The Association is convinced that in taking up an attitude of determined opposition to these undesirable journalistic methods the Association is acting in the best interests of the public as well as of the medical profession. The extension of the system can only lead to a competition for public notice in which the more scrupulous men would be left behind, to the detriment of the public who are ill-qualified to judge of the true worth of scientific opinions. The extension of the advertising habit among the profession in general would certainly destroy those traditions of dignity and self-respect which have helped to give the British medical profession its present high status, and would gravely undermine the amenities and harmonious working of medical practice. The Association, therefore, draws the attention of the profession to the danger of these objectionable methods, and insists upon the urgent need that every member of the profession who values its honour should offer a firm resistance to them. If only those whose reputation is mainly derived from newspapers allow their names and opinions to be quoted or to appear as those of 'the

eminent' physician, surgeon, or specialist, the practice will die a natural death."

Locum-Tenents.

The following motion governing the conduct of a practitioner desiring to set up practice in the area in which he had acted as a locum-tenent was carried without discussion:—

That as a locum-tenent is introduced in confidence to the practice of which he takes charge, it must be presumed on principles of common equity that he cannot without dishonour commence practice in the neighbourhood where he has acted unless with a written consent obtained either from the practitioner whose substitute he has been or from the legal representatives of this practitioner. There may, however, be circumstances, for example of lapse of time, which would make the strict application of this rule an unreasonable interference with the freedom of the practitioner who had acted as a locum-tenent. If any such plea for the relaxation of the rule in any individual case can be advanced the facts should be stated to the Central Ethical Committee, and the judgment of the Central Ethical Committee on the point should be accepted as final.

Blacklegging.

A discussion followed on a motion brought forward by Dr. M. W. Renton, on behalf of the Dartford division, arising out of certain practical difficulties experienced by the Kent branch, which were explained to the meeting by the branch secretary, Dr. E. A. Starling. The present regulation allowed a practitioner to apply for a post at a salary below the B.M.A. scale in spite of protests, to secure the appointment, and then to negotiate with his employers so that the salary was brought up to the minimum by means of addition or emolument. He would then be restored to his position in the profession, to the chagrin of loyal members who had withdrawn their applications. Dr. Langdon Down expressed his sympathy with the aim of the Kent branch, but did not consider it necessary to alter the ethical rules to attain that end. Rule V. was intended to apply to established posts already held, in order to give their occupiers an alternative to resignation. Any individual applying for a new post advertised at an inadequate salary should be dealt with under Rule VI. as a recalcitrant member. The Association had been passing through a transition period in the matter of salaries, and no final decision had yet been reached. Both he and the solicitor, Mr. W. E. Hempson, urged the meeting not to throw the ethical rules again into the melting-pot, nor to make an alteration without considering very carefully where it might lead. The motion was lost.

Alleged Abuses of Psycho-analysis.

Dr. A. Lyndon (Hindhead) formally proposed a motion:—

That the Representative Body instruct the Council to consider certain practices alleged to be prevalent among some medical men practising psycho-analysis and to report.

Dr. J. A. Parry (Brighton), bringing forward examples of the practices referred to, said he wished it to be clearly understood that this was not an attack on psycho-analysis as such, but was the result of much careful consideration by the Sussex Branch Council for many months. Judges and journalists were discussing these things, and it behoved the medical profession to take some action lest it be forced on them from without. He asked for discreet investigation, not condemnation.

Dr. Langdon Down said that there were two ways in which a practitioner might be considered by others to fail in his practice. He might hold a judgment with which his fellows entirely disagreed, but this could only be made an offence if the whole question were considered and rules laid down as to what was right, or he might deliberately do things contrary to his judgment, which would be extremely hard to prove. The best means open to the profession for the propagation of truth were scientific meetings and the columns of the medical press. Where a medical practitioner committed an offence against the public the remedy lay in the hands of the offended party; it was no part of the profession's duty to act for him. The speaker doubted whether the matter were worth putting to the Council.

Dr. Hawthorne agreed that it was a case for the police or the General Medical Council, rather than for the British Medical Association, which was not a legal judicial authority.

Dr. C. E. Douglas (Fife) said that this was an important and very serious allegation, far too important and difficult for the Representative Body to deal with. The Council could receive evidence for and against, and give a considered report.

Dr. Bolam said that there might well be matters for the police or the General Medical Council in this investigation, and yet be a residuum that might be dealt with by the Association or by representations from the Association in other quarters. He suggested that the whole question should be referred to the Council for consideration; beyond that it would be hazardous to go.

Dr. Parry accepted this amendment.

Health Insurance Service.

The reports of the Non-Panel and National Health Insurance Acts Committees were considered and accepted.

Dr. H. G. Dain (Birmingham Central) referred to the work of the latter in preparing evidence for the Royal Commission, and in establishing a panel of some 500 ophthalmic surgeons willing to see insured patients under the new ophthalmic benefit scheme. During the year the public press had taken active notice of certain difficult cases in which the Ministry of Health had given judgment. The Committee had obtained remission of the unpaid part of the fine in one of these cases, and had laid down four definite principles which should hold in cases where the Minister had to give judgment. To these the Minister had agreed, only differing in some slight details as to their application. The Defence Trust Fund had increased to £73,000, and the Committee had decided that the interest from it should be used in defraying expenses. Before long they might be considering what amount could be considered a sufficient reserve; at present they hoped that all committees would continue their subscriptions.

Appeal to the High Court.

A considerable discussion followed on the motion of Dr. H. J. Milbank-Smith (Chichester, Worthing, and Horsham):—

That it be an instruction to the Council that when consulting the divisions as regards any suggested amendments of or additions to the policy of the Association in reference to the National Health Insurance Acts, or extensions of the same, they include for consideration the following proposal—namely, that, in addition to the right now enjoyed of appeal to the courts on the ground of improper procedure, appeal to the High Court shall be legitimate against any penalty, other than removal from the panel, imposed upon a practitioner by the Minister.

Dr. Milbank-Smith referred to recent cases in which the finding of the Minister had been contrary to that of a committee appointed to consider the case carefully. Much distress and anxiety had been caused to the profession by the lack of any possibility of appeal. An appeal in the Harnett case had completely reversed the situation and enormously strengthened the position of the profession. There might be a better relationship with the Ministry now, but ministers changed and there was no security that this would continue.

Dr. L. J. Picton (Chester, Crewe) said that N.H. Insurance had set up a new relationship between the practitioner and his patient, introducing a third party in the contract. The Common Law of the land should be the factor to adjust differences; the judges themselves did not think this would be unconstitutional. The patient could appeal to Common Law, and if a panel patient did so the Minister withheld his decision until the case had been tried; the doctor had no such right of appeal.

Dr. Dain reminded the meeting that a joint conference representing the whole profession had already agreed on this principle, and asked that cases involving

removal from the panel should be submitted to a purely medical tribunal, while cases involving a fine should have the right of appeal to the High Courts.

The motion was lost.

Disciplinary Action by the Minister of Health.

Dr. R. D. Mothersole (Bolton) proposed:—

(1) That the Representative Body strongly protests against the action of the Minister of Health in penalising Dr. X. for an alleged offence of which the Committee of Inquiry had declared that Dr. X. was not guilty, and that the charge ought not to have been brought; and (2) that the Minister of Health be invited to state what are the functions of a Committee of Inquiry, and how far its findings are binding on himself.

Dr. Dain said that representations had already been made to the Minister of Health on this matter, and he had agreed that judgment of proficiency must be a subject for the General Medical Council alone. The aim of this resolution had already been accomplished.

Some discussion followed, in which Dr. Brackenbury said it would be the opposite of serviceable to reiterate this protest, and Dr. Wallace Henry pointed out that to pass to the next business would look as if the meeting did not approve of the protest. The motion was eventually withdrawn in favour of the motion proposed by Dr. R. Wallace Henry (Leicester and Rutland), and seconded by Dr. J. F. Walker (South Essex):—

That this meeting approves the action of the Insurance Acts Committee in protesting in the case of Dr. X., and welcomes the declaration of the Minister of Health that he accepts the principle put forward by the deputation.

Royal Commission on Insurance.

Mr. E. B. Turner questioned the action of the Council in submitting the memorandum to the Royal Commission without bringing it before the Representative Body as such. He was extremely jealous for the democratic constitution of the Association and the rights of the Representative Body in which he had held every office from representative to chairman.

Dr. Bolam replied that the representatives had entered cheerfully into the method by which the Council had tried to obtain the opinion of the whole profession, and in his opinion it would have been very foolish to let the dry bones of the constitution over-ride the circumstances. The Association had repeatedly disregarded its standing orders in the effort to ensure that there should be no vestige of suspicion that it was trying to put forward anything in the name of the profession when outsiders had had no voice in it. The proceeding was eminently calculated to get the opinion of the whole profession as far as possible.

The Chairman pointed out that the evidence was not given as that of the Representative Body, but as that of the Council of the B.M.A. after certain procedures which were clearly set out. The present time was the correct occasion for the Representative Body to approve or censure the action of its Council.

No motion was put, but the applause that greeted Dr. Bolam's statement, showed that the meeting was satisfied that the method was a proper and constitutional way of dealing with the occasion.

Dividends on Panel Prescriptions.

Dr. C. J. Kirk (Darlington) then proposed:—

(1) That the action of the Coöperative Societies in allowing the prescriptions presented by patients under the National Health Insurance Acts, who are also members of the Coöperative Societies, to rank for dividend is entirely opposed to the spirit of the Acts. It is calculated to encourage malingering, to throw unnecessary work upon the practitioners administering the medical benefit, and to bring the work of the Insurance Acts into disrepute. (2) That the Council be instructed to press the Ministry of Health to remove this abuse of the provisions of the National Health Insurance Acts.

On the suggestion of Dr. Dain, it was resolved:—

That the motion be referred to the Council for investigation as to the extent of the practice.

Election of Council.

During the course of the day the unopposed return of the following 12 members to Council was announced: Dr. G. B. Hillman, Dr. I. W. Johnson, Dr. J. W. Bone, Dr. T. Ridley Bailey, Mr. E. B. Turner, Dr. W. Paterson, Dr. C. E. S. Flemming, Dr. S. Morton Mackenzie, Dr. C. E. Douglas, Dr. J. G. McCutcheon, Dr. John Mills, and Dr. J. Singleton Darling.

SATURDAY, JULY 18TH.

Membership of the B.M.A.

In presenting the report of the Organisation Committee, Dr. S. Morton Mackenzie said that the membership now totalled 29,680, a figure 3000 higher than ever before. He did not believe that the increase was a "flash in the pan," but it could not be expected to continue at that rate. They were particularly anxious now to do more for the young practitioner. The establishment of a scale of remuneration had placed them in the position of asking these men to give up posts without offering any help.

Locum Bureaus.

One way of helping them was by the foundation of a locum bureau, which was a real need in the provinces. Already several such local bureaus were in existence, but at present their position was unregularised. Legally the Association could not undertake such an activity, but it was proposed to form a private limited liability company in which the A shares, conveying voting power, would be held by officials and officers of the B.M.A., and the annual meeting of the company would be held during the session of the Representative Body.

A number of members asked questions, and discussed the legality and details of the proposed scheme.

Mr. Bishop Harman urged the meeting to express its opinion on the general principle and leave the details to the Council, who might be trusted to take every legal and financial precaution. Delay was dangerous as such bureaus were constantly being formed, and the more there were the greater the difficulty of coördination.

After some discussion as to the advisability of giving preferential treatment to B.M.A. members, the principle was approved.

Individual Medical Defence.

Dr. Morton Mackenzie, introducing a resolution authorising the Council to prepare a draft scheme and ascertain the number of members who would join in it, said that the discussions at Portsmouth and Bradford had made the Committee realise that there was still a very considerable minority that desired the Association to undertake the legal defence of its members. The Committee had, therefore, persuaded the Council to allow a thorough investigation of the matter, financially and historically. The history of the question had been written by Miss Lawrence, the intelligence officer, and showed that the argument had been going on for 50 years, and that the Council had repeatedly allowed the matter to slide even when the Representative Body had passed resolutions in favour of it.

Dr. Mackenzie said he thought he could shorten discussion by laying down certain propositions. First, he thought they were all agreed that if there were no existing defence societies it was a work the Association ought to undertake; secondly, they were quite agreed that the Association could not legally undertake the work under its existing articles and memorandum; thirdly, at the moment any form of coöperation with the existing societies was quite out of the question. He had held the opinion that the true solution of the question was to do it in coöperation with the existing societies, but he was sorry to say that neither of these societies had seen their way to accept the overtures.

The possibilities before the Association were: (1) Full medical defence for all members, either in conjunction with or in opposition to the existing societies. This he thought was not possible because very many members were quite satisfied with the societies. (2) Optional full defence for those members who wished for it. (3) Partial medical defence—e.g.,

every legal help given up to the door of the court and then no more, or meeting those expenses which were not paid by existing societies. (4) The establishment of a legal bureau at the offices for advice and help. In his opinion (2) was the only solution; it would satisfy those members who were agitating for B.M.A. defence without upsetting those who preferred to remain as they were. The disadvantages were few; there would be no reserve fund at first, but the new company would have the backing of the Association, and the brains in the B.M.A. office were quite as competent to manage the affair as any in the existing societies. It would require 6500 members to make its inauguration a sound financial proposition.

A motion from Guildford impugning the Council for bringing up the subject after the Representative Body had voted against it was rejected, but a lengthy discussion followed the amendment by Cardiff:—

> That as the matter of individual medical defence is being competently dealt with by various existing bodies, and as it does not appear that the Association could conduct medical defence in any cheaper or better manner, and as the provision of individual medical defence is not within the present powers of the Association, this meeting is of the opinion that the matter should be dropped, and that the expense of the proposed referendum of the profession be not incurred; but that the Association should bring to the notice of all practitioners, especially those recently qualified, the urgent necessity of joining one of the medical defence bodies.

Dr. Peter Macdonald (York) and others raised the question of indefensible conduct and the loss of prestige to the Association if it found itself compelled to defend such a case.

Mr. McAdam Eccles (London) and Dr. S. N. Scott (Plymouth) spoke of the difficulty of persuading men to join the Association when their immediate question as to the provision of defence had to be answered in the negative.

Several members, including Mr. E. B. Turner and Dr. J. C. Matthews, voiced the impracticability of the scheme. The financial position would be most insecure at first, the new company would be unable to meet a large case; it would be most unfortunate for the Association to have to defend a man brought before the General Medical Council, and all B.M.A. members would have to leave the Council while such a case was being tried.

Dr. D. Lawson urged that the cobbler should stick to his last; he was not so optimistic as to accept the estimate of the ability of the B.M.A. staff, and its funds had not been accumulated to squander on speculation.

Dr. J. Neal (Hendon) said that the requirements of the profession were already fully met, and this doubtful experiment offered no advantage to its members. He denied that the existing societies had ever been asked to coöperate; they had only been asked to grant financial concessions, at their own expense, to members of the B.M.A.

Dr. J. F. Walker (Essex) thought that this dangerous weapon would be looked upon as an attempt on the part of the B.M.A. to entrench themselves behind their prerogatives to the detriment of the public and might well prove to be another horse of Troy.

Other members, including Dr. C. Sanders and Dr. C. E. Douglas (Fife), pointed out that the resolution only asked the Council to obtain information and report in order to show what the demand was and how far it might be practicable. If the scheme came into being it would only be by the support of the younger men; the seniors were loyal to their own societies and were not going to let them down, but times were changing and young men were coming on; this might be the step of the future.

Dr. Christine Murrell (London) said that if the new company were to be closely associated with the B.M.A., the practical difficulties would be very great and might be disastrous; if it were to be but loosely connected it would be equivalent to setting up a third society for which there was no particular need. There was a definite advantage to the individual in being able to get the little difficulties of practice redressed by a protection society without having to make it known to the professional and scientific association.

Dr. Dain believed that individual medical defence would mean loss of prestige; the Association had always maintained that anything it did must be in the interest of the public or else it could not be in the real interest of the profession. He thought the solution lay in real coöperation with the existing societies, which need not necessarily mean preferential treatment.

Dr. J. S. Manson (Warrington) suggested that the local division might decide whether any particular case should be taken up by the B.M.A. or not, but as Dr. Hawthorne and Dr. E. E. Brierley pointed out, this would place the divisions in an invidious position and might lead to conflict between the local and central authority.

Dr. E. R. Fothergill (Brighton) spoke of the difficulty of finding a suitable firm of solicitors, and said that the only real coöperation was for the B.M.A. to increase its subscription to £1 and offer to pay the subscription to any defence society the member chose.

Mr. Bishop Harman said that there was a growing involvement of medical defence with general propositions; it was no longer possible to leave defence of the individual to one society and of the profession to another. In the Harnett case the defence of the individuals had been the defence not only of the profession but of the public. Already the defence societies were giving advice on general medical matters. Coöperation was desirable, but coöperation could not be attained until the B.M.A. made up its mind what it was going to do. The future lay with those who had closest touch with the new practitioners. He begged the meeting to let the Council find out once and for all what was the volume of the demand which had so frequently made itself heard in the history of the Association.

The amendment by Cardiff was carried, on a roll-call vote of 97 to 72, and the principle of individual medical defence was thus again rejected.

Inquiries and Badges.

In moving the adoption of the Supplementary Report under Organisation, Dr. Morton Mackenzie said that the questions answered at the offices were increasing in multitude and variety; in addition to problems of practice and lodgings, they were asked how to open a banking account and how to get married, and, more particularly, about post-graduate work, which must clearly be the next activity of the Association. The overseas branches were in a satisfactory condition. New members of the Standing Committees were wanted. It was proposed that branch and division chairmen and secretaries should have a standard badge to enhance the dignity of their office.

Dr. C. G. H. Morse described a series of successful post-graduate courses in Bournemouth, and hoped the B.M.A. would not look on London as the only place for post-graduate work.

Dr. J. Stevens proposed that miniature badges should also be prepared, that ex-chairmen and secretaries might keep as permanent mementoes of their work.

Parliamentary Fund.

Dr. E. K. Le Fleming (Dorset and W. Hants) presented the report of the Parliamentary Committee and emphasised the fact that the Association had no political bias, but required that those who received its support should subscribe to the broad principles of policy laid down by the Representative Body. So long as the Labour Party had as a plank in its platform the State Medical Service and State aid for hospitals they could not assist its candidates. The position of the profession in Parliament was much more satisfactory than hitherto. The aim of the Committee was that the requirements of the profession should be clearly stated in the House, but the state of the Parliamentary Fund was still very unsatisfactory.

Investiture.

During the meeting the Chairman was invested with the new badge of office, bought in honour of the twenty-first meeting of the Representative Body, by Dr. W. Douglas, "the father of the Representative Body," supported by Dr. Milner Moore, a member of the Association since 1869.

(*To be continued.*)

CONVENTION OF ENGLISH-SPEAKING OPHTHALMOLOGICAL SOCIETIES.

LONDON, JULY 14TH–17TH.

(*Continued from p. 150.*)

ON the evening of Wednesday, July 15th, there was a very large gathering of members of the Convention to hear a symposium on the subject of the

EVOLUTION OF BINOCULAR VISION,

the chair being occupied by Mr. Treacher Collins, the President.

Prof. Elliot Smith said there were certain aspects of this problem upon which anatomists could throw a certain amount of light, or at least they could define certain issues which other speakers could more fully interpret. He considered that the problem of binocular vision was of the very essence of the question of human evolution, as the cultivation of vision and the increased reliance on it for guidance was the fundamental fact which brought about the evolution of the Primates and led to those distinctive qualities which differentiated man from other living creatures. Man's ancestors were certainly the first creatures to see the world in the sense properly understood. Such vision resulted in the ability to perform skilled movements and to acquire by experimentation a knowledge of the world and of the events taking place in it, the knowledge which placed man in his position of supremacy. Thus, the problem was not merely that of the functional association of the two eyes in vision, but a study of the factor which constituted the primary stimulus to the emergence of the distinctive qualities possessed by man. The student had first to try and trace what series of animals could throw light on this gradual development. Fortunately, in the case of the Primates there survived—in many cases from the Tertiary geologic period—a series of creatures which had escaped the devastating effects of extreme specialisation, and so enabled a study to be made of the phases through which man's ancestry passed. The Primates came into existence in North America, near Wyoming, before the beginning of the Tertiary period; there they separated from the group of insectivorous animals, which had been studied so well by Mr. Le Gros Clark in Borneo, who specially examined the structure of the eye and retinæ, the cerebral cortex, and the oculo-motor nucleus. Shortly before the beginning of the Tertiary period the lemurs came into existence, and in one particular class smell began to be replaced by vision as a guiding sense. Primitive monkeys came into existence in the middle of the Eocene period, reaching Europe from South America, and they split up into tailed monkeys and the higher group of anthropoids. It was not until after that period that the giant anthropoids came into being. The nearest remains of the human family belonged to the Pleistocene period, but there still remained a gap which was unspanned. The most important class of animals for this study was the tarseus, as it had survived from the beginning of the Eocene period with practically no change. There was a shrinking and flattening of the nose to allow the eyes to come to the front of the face, so that the creature could look forward, and the visual fields overlapped almost as much as they did in the case of monkeys and in man. It was possible to demonstrate the fact that the ora striata reached its maximum size even in the most primitive monkeys, so that as the brain was much smaller in them than in the higher Primates, the visual cortex in them was proportionately great. Using this method, the speaker was able some years ago to map out, without histological technique, the distribution of the cortical areas in the series of animals represented in a diagram he exhibited, commencing with the jumping shrew. The primitive animal was guided by its sense of smell, but in its arboreal cousin smell was reduced and place was given to areas for vision, hearing, touch, &c. It was the development of the visual cortex which led to the emergence of the tarsoids, and in these there was an enormous reduction in the cortical area assigned to the olfactory sense and an increase in that subserving sight. He made this inquiry 15 years ago, and since then Mr. Le Gros Clark had shown the same thing by histological methods. Comparing the tarseus with the marmoset, a profound transformation in the brain structure was noted. Not only was the brain of the latter much the bigger, but there was a great expansion of areas allocated to sight, hearing, touch, and the pre-frontal region generally. All this made for increased precision of movement, and especially of finer movements. Equally certainly a very profound accompaniment of delicate intensive manipulations was the acquisition and development of binocular vision.

A striking pre-binocular vision stage was illustrated in the case of the chameleon, for this animal could look forwards with one eye and backwards with the other, and it used its eyes for fixing an object in much the same way as it shot out its tongue to seize its prey. The actual fixing of an object by the eyes occupied some minutes, the concentration being, doubtless, on the muscular act rather than on the object seen. It was this linked separate movement of convergence which had developed in mammals. Dr. Wilfred Harris had shown that the optic tracts of all vertebrates other than mammals could cross, but a certain number of fibres remained uncrossed. In some animals there was a reduction in the size of the snout, which allowed the eyes to move forwards, a prior necessity before stereoscopic vision could be acquired. Mr. Le Gros Clark had examined the retinæ of both living and dead tarseus, but was unable to find anything resembling a macula, either by ophthalmoscopic examination, by gross anatomy, or by histological methods. But though the eyes of tarseus looked forward and it had developed its ora serrata to a greater extent than had the lemur, and though its visual fields overlapped, it yet had not acquired full powers of stereoscopic vision, nor of guiding its hand movements as the monkey could, nor of carrying out a range of conjugate movements. There was evidence, however, that this animal felt the need of these accomplishments, and in obedience to that need it acquired the ability to so move its head that it could and did look backwards, as shown by an actual photograph. Research during 40 years had shown that it was the great pre-frontal area of the brain which was concerned with controlling these more complex conjugate movements which were distinctive of the apes and man. A true macula lutea was found only in the latter two species. In marsupials there was a small region in front of the motor area which controlled movements in only one eye. He showed slides of micro-photographs demonstrating that the eyes underwent transition from lemur to tarseus and then to monkey.

Sir Frederick Mott referred to the thesis he propounded in his Bowman lecture of 20 years ago, when he dealt with the evolution of binocular vision coincidently with that of the visual cortex. The conclusions then expressed had been confirmed, and he had not had the opportunity of carrying his research further. He exhibited slides showing that the lunate sulcus seen in all anthropoids was sometimes to be observed in man also. With the rise in the animal scale the peri-striate area of the occipital lobe was found to be increased, and coincidently there was a greater development of the frontal region of the brain. It had been found by Prof. Watson, of Baltimore, that

a baby could fix a light soon after birth, but not until the 130th day did it acquire associated hand movements. It was found that in the full-term fœtus there was a myelination of the optic radiations, and hence it was argued that this region was instrumental in fixing the light. Sir Frederick Mott showed that all our visual experiences were associated with tactile perceptual ones, and exhibited a number of slides illustrative of the work which Prof. Sherrington and he did together. Closely associated with the area concerned with the conjugate movements of the eyes was that regulating movements of the eyelids. His conclusion was that the frontal region of the brain was that concerned with attention, and especially with that associated with binocular vision.

Prof. S. E. Whitnall (McGill) explained that his interest in this problem had been mainly with the movements of the eye muscles during the gradual transition of the eyes from the side of the head to the front of the head. He first pointed out how little animals, especially mammals, moved their eyes in order to see. Lemurs and all animals below them moved their heads instead of their eyes, and human beings moved their heads in order to see to a greater extent than was usually realised. This was appreciated in the light of the sense of inconvenience when one suffered from a stiff neck. The more an animal felt the need to increase its visual field, the more developed its muscles became. But one could find that some means were taken to compensate for this lack of development of muscles. If the eye was not moved to increase the visual field, the orbit could be moved, thus increasing the avenues of approach to the retina, and in herbivora there was an elongated pupil with the same purpose. Throughout all the vertebrate series there were the same four recti and two obliques. Prof. Whitnall showed by a series of diagrams the changes which occurred in the muscles of the site pari passu with the gradual swinging of the visual axes from the side to the front of the head, the angle subtended by the visual and orbital axes varying from 27° to 80°. He dealt in much detail with the change seen in each pair of muscles, and showed illustrations from Lindsay Johnson's atlas of the visual axes in various mammals.

Sir Arthur Keith, in view of the full contributions of his predecessors in this discussion, confined his attention almost solely to the chief modifications which had been gone through by the orbit and the skull in the evolution of binocular vision. Presumably, man began to take on a recognisable human form in the Miocene period, but his ocular outfit existed long before—namely, in the Eocene period—and he preferred for it the name "bifoveate." Even the marmoset had this. The progeny of the bifoveate stock had fared very differently in their evolutionary progress. Some had retained their ancient characters, others, such as man, had shed them. Between them was a series of intermediate forms, seen in living Primates, representing stages in evolutionary progress. By a deft use of these intermediate forms Prof. Elliot Smith had been able to build up a reliable evolutionary history of man's vision and of those parts of the brain which were concerned with that faculty. One of the greatest services rendered to anatomy was Prof. Elliot Smith's clear proof that the evolution of bifoveate vision was the result of sight ousting smell as the dominant sense. Sir Arthur Keith did not consider that the swinging forward of the eyes so that their axes became parallel had anything to do with the reduction in size of jaws, nor that bifoveate vision was a necessary result of arboreal life; he thought it was closely linked with the mode of climbing, and mode of locomotion seemed to have been a dominant factor in the evolution of the true Primates. All bifoveate Primates were jumpers, and they must be able to judge the distance of the branch they wished to reach. The golfer's axiom "Keep your eye on the ball" had a much older counterpart in the jungle, "Keep your eye on the branch." Twenty-four years ago the late Dr. Lindsay Johnson showed that though monkeys, anthropoid apes, and man had the same form of eye and retina, the same outfit of ocular and orbital muscles, these creatures differed widely in the degree and kind of their eye movements. In ordinary monkeys head and eyes moved together, there was but little power of lateral movement of the eyes. In the great anthropoid apes conjugate movements were free and frequent, convergence could be sustained only during short spells. It was clear that man's visual superiority lay not in the kind of eye with which he had been provided, but in the brain which had grown up behind the eyes. No one, he said, who had watched the gradual dawn of perfect vision between birth and childhood could doubt the truth of evolution; the facts deduced that evening could only be explained by supposing that man had been evolved from a very humble and primitive simian ancestry. But we remained still in the dark as to the evolutionary machinery which had transformed the visual world as seen by the marmoset into that seen by man. When this machinery was explained it must cover all the structural elements as they developed in the body of the embryo and of the fœtus. When it could be explained how man came by his vision, then the most difficult part of the problem of evolution would have been solved.

On Thursday, July 16th, Sir John Parsons delivered the Bowman lecture, which appeared at length in our last issue.

On the morning of Friday, July 17th, the session combined to debate on the

MICROSCOPY OF THE LIVING EYE,

the President occupying the chair.

The Cornea.—Dr. Gordon Byers (Montreal) dealt with the cornea, remarking that because of its accessibility and the transparency of its refractive media, the eye early became a field for study by what had come to be called the "direct" method of pathological examination. With increasing accuracy and fullness the changes noted were isolated and described as the objective symptoms or signs of the clinical pictures. But though the direct method did evolve aids of great value, beginning with the introduction of focal illumination by Himley over 100 years ago, limits to its effectiveness were imposed by difficulties of illumination which seemed at the time to be insuperable. The value, he said, of the new method lay rather in its disclosing changes collectively, and in their topographic relations, a service of which the pathologist stood in need. For him it made significant many details which merely as scattered findings were without meaning. To the clinician the method gave fresh opportunities to add to the number and the qualities of his clinical pictures. Pathological changes in the cornea were observable with a special fullness and distinctness by the new method, because of the variety of illumination which focal structural differentiation made available for disclosure. Still, the revelations of the slit-lamp would probably be less novel in the cornea than it would in other components of the organ. He thought that betterment would consist rather in the addition of a wealth of detail and a truer perspective to details already established.

The Vitreous.—Dr. Arthur Bedell (Albany, New York) said the slit-lamp offered a method for the more careful study of vitreous detail than had htherto been available. The vitreous, when examined by this method, showed innumerable variations in the definition of the folds of the frame-work and the consistency of the fibres in health. In disease the changed frame-work might consist in the massing of fibres and liquefaction and absorption of structures, and in pigmentation. He considered that no case of penetrating injury had been properly investigated until the slit-lamp had been skilfully used; and prognosis in such cases was never exact until such demonstration revealed the presence or absence of tension fibres which might be a cause of subsequent detachment. He gave a series of hints as to the use of the instru-

ment, and showed slides illustrative of the appearances seen in uveitis, retinitis proliferans, detachment of retina, asteroid hyalitis, and traumatic vitreous. In connexion with cataract extraction, Dr. Bedell said there was always a prolapse of vitreous after this operation if the posterior capsule was opened.

The Lens.—This part of the subject was dealt with by Mr. T. Harrison Butler (Birmingham). He said the lens was suspended in the eye like the hub of a bicycle and was completely surrounded by aqueous. The retro-lental space was a cleft filled with aqueous, and it disappeared in cases of degeneration of the vitreous. After the removal of cataract in the young the retro-lental space was greatly enlarged. He said that in cases of congenital dislocation of the lens the zonule might be complete, rudimentary, or absent altogether. When the lens was forcibly dislocated, the zonular lamella might peel off with the fibres of the suspensory ligament, which were not then found attached to the lens. He showed drawings illustrating detachment in lens dislocation, in glass-blower's cataract, and in an example of a shrunken lens. The lens sutures were known to constitute the sites of various kinds of cataract. The lens shagreen he regarded as due to the intimate structure of the capsule itself. He showed that an abnormal growth of the lens zones caused central cataracts, and to the varied forms of zonular or lamellar cataract. He suggested that the varied curves associated with appropriate refractive indices were so balanced that chromatic aberration was corrected.

Mr. Basil Graves dealt chiefly with the optics of these new instruments, and had a good many hints to impart on their successful use. His contribution was chiefly an epidiascope demonstration.

Miss Ida Mann spoke on the embryology of the lens and the correlation of it with slit-lamp appearances. In the first stage shown the lens was present only as an open pit in the surface ectoderm. At this stage could be seen the beginnings of the free cells, which were later seen in the cavity of the lens vesicle, the persistence of which Vogt considered was the cause of anterior axial embryonic cataract. But examination of this and succeeding stages to full term made this unlikely, as the opacities described as occurring in the adult lens were in the neighbourhood of the anterior Y-suture, while the potential cavity of the lens vesicle was immediately under the anterior lens epithelium.

Other participants in the discussion were Mr. Charles Goulden, Mr. Inglis Pollock, Mr. Gray Clegg, Dr. Feingold, Dr. Zentmayer, Dr. Finoff, Dr. McLean, and the President. The openers replied.

READING OF PAPERS.

At the afternoon session on Friday papers were read covering a wide variety of subjects. Mr. Leslie Paton and Miss Mann presented an elaborate thesis on the

Development of the Oculo-Motor Nuclei

and its bearing on the Argyll Robertson pupil reaction. They said that the break in the reflex arc which brought about the Argyll Robertson pupil probably occurred in the secondary intercalated neurone, which had its cell of origin in the anterior corpus quadrigeminum and whose axone passed down and probably bifurcated so as to link up with the third nerve nuclei on both sides. If the Edinger Westphal nuclei were concerned in the innervation of the sphincter pupillæ it was probable that the light reflex fibres were non-myelinated fibres running through the central grey matter straight to the neighbourhood of the Edinger Westphal nuclei. But Magitot contended that the Edinger Westphal nuclei could not be concerned with the control of the sphincter iridis, because in the human fœtus neither they nor any of the other anterior accessory nuclei of the third were developed at a time when the light reflex was already existent. That authority had seen the light reflex in a child which was born at the end of the fifth month, whereas the nuclei in question did not appear until the seventh month of intrauterine life. Mr. Paton suggested a reinvestigation of the embryology of the third nerve nucleus and its accessory nuclei, as that might throw light on this difficult question. A result of the examination of human embryos at various stages undertaken by one of the authors of this paper was that it seemed that the differentiation of the third nerve nucleus into its component parts commenced at a comparatively early stage, being well advanced before the end of the fifth month. Reference was made to the work of Kappers, and Mr. Paton said it could be shown that in human embryos the median nucleus appeared early, before the accessory nucleus, at a time when the swinging round of the eyes from the sides to the front of the head was taking place, while the appearance of the accessory nucleus was delayed until the first signs of differentiation of the margin of the optic cup to form an irido-ciliary region. In fœtuses of three and a half to four months the typical small cells of the accessory nuclei could be recognised, the anterior layer of the ectodermal part of the iris at the same time giving rise to the muscle-cells of the sphincter pupillæ. Thus, in both phylogeny and ontogeny the appearance of the median nucleus was associated with the possibility of convergence, and that of the Edinger Westphal nucleus with the possibility of a light reaction.

Glioma Retinæ.

Dr. J. Van der Hœve (Leiden) showed photographs of metastases of glioma retinæ in various parts of the head of a child after binocular enucleation, with the result of causing a massive disfigurement of the whole head and face. Exenteration of the orbit showed an optic nerve three to four times the normal size. The enlargement of the optic foramen he regarded as of serious prognostic import. In unilateral glaucoma the eye should be enucleated. Usually bilateral glaucoma did not come to the surgeon's notice until the disease had totally blinded one eye. In such cases the blind eye should be removed and the other should be treated by irradiation, though the results of this latter were not, he thought, very encouraging. The author thought that radiographs of the optic foramen should be more frequently carried out, as they would afford valuable diagnostic information, as well as giving a clue as to prognosis and treatment. Radiotherapy did not yet seem to have brought about many absolute cures of glioma.

Blood-Chemistry of Patients with Primary Cataracts.

Dr. Maxwell Langdon (Philadelphia) read a paper in which he pointed out that certain physical conditions accompanying lens degeneration caused also urinary changes, and he had been engaged since 1920 in an investigation of the blood-sugar and sugar-tolerance, also the blood-urea nitrogen and creatinin. Mostly his findings had been negative, and the analysis seemed to be of value only as regards sugar, several cases of potential diabetes having been discovered in which this appeared to be the only indication.

Intracapsular Extraction of Cataract.

A paper on this subject was read by Dr. A. H. H. Sinclair (Edinburgh), who showed in connexion with the paper some new instruments and explained their uses. He said the methods of intracapsular extraction practised to-day could be stated thus: (1) Dislocation and expression of the lens by pressure on the outside of the eyeball; (2) the dislocation and extraction of the lens by taking hold of its anterior capsule and removing it by traction; (3) a combination of traction and external pressure either simultaneously employed or with pressure following on forceps dislocation. He said his own method of intracapsular extraction now described was carried out with blunt forceps. The resultant vision in which the lens was removed completely came out as follows: 6/5 in two cases, 6/6 in 16, 6/9 in eight, 6/12 in one, 6/18 in one, 6/60 in one. He

explained that in nine cases the lens were not extracted complete in the grasp of the forceps. In these the vision was 6/5 in one, 6/6 in three, 6/9 in one, 6/12 in two, 6/18 in two. In his second series of 21 cases, since he had used his "expressor guard," there had been no loss of vitreous, and in this series there was only one case of iritis. The average vision in his first series was 6/11, in the second 6/7. Dr. Sinclair gave a remarkable cinematograph demonstration of the actual operation.

Late Results of Intracapsular Cataract Extraction.

Dr. Arnold Knapp (New York) related some late results of intracapsular cataract extractions in his practice. He said that criticism had been levelled against intracapsular cataract extraction because, in addition to vitreous loss in many, there was undue damage caused to the eye, the pupil was displaced, and set going degenerative changes which eventuated in damage. Some advocated retention of the posterior capsule, as it constituted an important support for the vitreous. Dr. Knapp submitted that the best answer on these points was furnished by a further examination, after a number of years, of patients on whom the intracapsular operation had been done. He did not think the ideal operation had yet been found. With this object he had followed up and re-examined as large a proportion of the 200 consecutive intracapsular cases done between 1910 and 1919 as he was able. He gave tables of results which were, on the whole, quite favourable. A small escape of vitreous did not seem to have any special significance.

Lt.-Col. H. Smith, I.M.S., said Dr. Knapp's results were very encouraging to those who thought of embarking on the intracapsular extraction of cataract, and the series reported showed that it was possible to exaggerate the seriousness of the escape of a small quantity of vitreous.

Sir Wm. Lister expressed his satisfaction that Dr. Knapp's contribution showed again that a successfully performed intracapsular extraction did wear. He had himself been astonished by the good results of the intracapsular operation as carried out by Colonel Smith, even in the bad cases, and he had himself investigated 91 cases in India. He asked ophthalmic surgeons to watch their cases in which they did the cataract operation and see what happened to them in a few years, and to base their views upon what they found.

Dr. Sinclair also considered that Dr. Knapp's series of operation results were very encouraging to those whose ambition it was to embark on this proceeding. He had not himself lost an eye after this operation in two and a half years.

Mr. D. V. Giri (Eastbourne) said that in many cases of hypermetropic cataract the vitreous was already fluid and filled with opacities, and when this was so the escape of a little vitreous even did good, as otherwise the degenerate vitreous might act as an irritant and cause further damage.

Dacryocystencleisis.

Mr. Eric A. Thomson (Beyrout) explained that this operation was intended as a substitute for dacryocystectomy, and was mostly indicated where the latter would be chosen, but hesitation was dictated by the infirmity or nervousness of the patient. The results were equally good. The operation consisted in the obliteration of the sac, canaliculi, and puncta by an inflammatory process caused by the injection of saturated corrosive sublimate aqueous solution, followed by absolute alcohol, strong tincture of iodine, alcohol again, and ether. The puncta were touched by the actual cautery as an extra precaution, and the cornea must be protected from the drugs employed. A pressure bandage and pad were kept over the region of the sac for six days.

Removal of Cataract in its Capsule.

Mr. John Hern (Darlington) contributed a paper in which he described his method of removing a cataract in its capsule, requiring the use of only two special instruments. These were: (1) An eye speculum which could be adapted to any face or either eye. A spring separated the blades, and by screw adjustments the lids could be slightly removed from the eyeball before operating. (2) A pair of forceps with entirely separate blades, fitted together by the ordinary "Smellie" lock. A preliminary iridectomy should be done, and the corneal incision should be limbal and fairly large. The chief danger was that from possible loss of vitreous, but with the lids so well under control by the special speculum there had been little trouble on this score; and he considered that the clear pupil and the impossibility of the occurrence of "after-cataract" more than compensated for this should it occur.

Lens Antigen Treatment of Cataract.

Dr. A. E. Davis (New York), in a paper with this title, said that by the use of lens antigen alone almost every case of cataract in its early incipiency could be arrested. Immature cataracts, up to 50 per cent. loss of function, in 85 per cent. of the cases could be arrested, and in more than half the cases there was improved vision. Mature senile cataracts he preferred to remove by operation. The prognosis was less favourable the later the cases were treated by lens antigen. The longest time he had had these cases under observation was four years, and the average loss of vision in the cases was about 12 per cent.

Recovery of Visual Field in Pituitary Tumours.

Dr. R. C. Davenport (London) reported two cases of pituitary tumour which were under the care of Mr. Foster Moore. Neither of them had marked glandular signs, but each showed primary optic atrophy and temporal hemianopia. In both the visual signs had been present some years, and had since been watched for three to five years. X ray examination revealed extensive bone erosion in the pituitary region in both patients. In one case one eye was blind, the vision in the other being 6/18. The whole temporal visual field was lost. The other patient had only the nasal half of the field in one eye, with an acuity of 6/12, that of the other eye being only 6/60, with only a small upper nasal section of the field remaining. The treatment of both was by irradiation of the head, directed to the pituitary region, and the fields had improved, but the visual acuity remained as before. A question which arose was as to how much the recovery might be spontaneous, and how much it was due to the shrinkage of the tumour from the application of the rays.

Cerebro-Macular Degeneration.

Dr. Gordon Holmes and Mr. Leslie Paton presented a paper on this subject. They said they had been able during recent years to examine ophthalmoscopically a number of cases of cerebro-macular degeneration of the Batten type. In most of them the retinal changes were fairly well marked when the cases came under observation. The occurrence of the disease in two members of a family led to the whole family being kept under inspection, and this resulted in the very earliest stages of the development being observed in a third member. The first noticeable change was the appearance of a small whitish area at the macula, surrounded by a reddened ring. Later, wavy radiating white streaks appeared on the retina; then the macula showed dotting, with granular pigment in and around the whitish area. The optic disc became paler and the vessels diminished in size. In the third stage the evidences of retinal atrophy spread out to the periphery, but the evidences were still most marked at the macula. Clinically, the cases were most closely related to amaurotic family idiocy.

Genesis of Myopia.

Mr. Ernest Clarke (London) examined the various inherited influences which had been suggested as the origin of myopia, and arrived, by a process of exclusion, to a confirmation of the view of Sir Arthur Keith that the origin of myopia was an inherited disorder affecting the very early growth of the sclerotic. He suggested that some bad cases of high myopia were

a manifestation of a disease of the coats of the eye, with myopia as a sequel, not as a cause.

Uveal Pigment in Diagnosis and Treatment of Sympathetic Ophthalmia.

A paper with this title was read by Dr. Alan C. Woods (Baltimore). He explained that the diagnostic tests were a complement-fixation reaction in the blood-serum against an antigen of uveal pigment and an intradermal test to determine the patient's specific hypersensitivity to uveal pigment. The treatment was based on the idea of removing the specific pigment hypersensitivity of the person by the repeated injection of small quantities of uveal pigment, which, at the same time, stimulated the production of specific antibodies. Dr. Woods's view was that this treatment was of definite value in sympathetic ophthalmia, but he did not regard it as an absolute specific. There was no reason against it being associated with other treatment. Dr. Woods said he did not think the ætiology of sympathetic ophthalmia had yet been fully demonstrated, but he considered that there was usually an allergic phase in the disease, and that uveal pigment was at least one of the factors concerned in this phase.

CONSTITUTION OF FUTURE CONVENTIONS.

A general meeting of members of the Convention took place on Thursday afternoon for the purpose of considering whether future conventions should be of an international character on a pre-war basis. After discussion a resolution was moved by Dr. Lucien Howe, and seconded by Dr. G. Ring to the following effect:—

That this Convention of English-speaking ophthalmological societies hereby empowers its President, Mr. E. Treacher Collins, to appoint a standing committee of five, of which he shall be chairman. The duty of this committee shall be to obtain such coöperation as is possible from representatives appointed by various national ophthalmological societies in promoting matters of international ophthalmological interest, for example: (*a*) Aiding or initiating measures by international intercourse likely to prevent the dissemination of diseases of the eye and the lessening of hereditary blindness; (*b*) the establishment of uniform methods of recording results of visual tests and other matters pertaining thereto; (*c*) the interchange of ophthalmological literature; (*d*) the promotion of international ophthalmological congresses.

This resolution was adopted as well as a further resolution, proposed by Dr. Howe and seconded by Dr. Ring, thanking the English organisers for their hospitality and for the general excellence of the arrangements.

VISITS AND FUNCTIONS.

During the week members of the Convention visited a number of institutions, such as the Royal Institution, the Royal London Ophthalmic Hospital, St. Margaret's Hospital, the L.C.C. Myopia School at Islington, St. Dunstan's, the Royal Westminster Ophthalmic Hospital, the Central London Ophthalmic Hospital, the National Library for the Blind, the Royal Eye Hospital (St. George's Circus), the Royal Normal College for the Blind, and the White Oak Ophthalmia School at Swanley.

At St. Dunstan's Hostel for the training and care of war-blinded men, the visitors were received by Sir Arnold Lawson, Chairman of the Ophthalmic Advisory Board, and by Captain Ian Fraser, M.P., Chairman of the Council, who gave interesting facts and figures with regard to the success of the work at St. Dunstan's. A total of about 1800 blinded soldiers had passed through the Hostel, of whom roughly 1000 cases were due to gunshot wounds or to explosive shell or bomb; under 300 were due to actual bullet wounds. A few were the result of concussion and accident; only three injuries were attributable to bayonet wound. A tour was made of the wards, classrooms, and workshops, where the visitors had the opportunity of seeing the skill and cheery spirit shown by the blinded men.

The Convention opened with a reception at the Royal College of Surgeons of England. Sir William and Lady Lister gave a garden party at Aubrey House on Wednesday afternoon. There was a reception at the Wellcome Historical Medical Museum on Thursday evening.

An *Official Banquet* at the Guildhall terminated the proceedings of the Convention. Mr. Treacher Collins took the chair, and the company included many distinguished guests. H.R.H. the Duke of Connaught, in replying to the Loyal toasts, said that the more the English-speaking peoples worked together, the greater the prospect of peace and prosperity for the whole world. The medical people of London were to be congratulated on their hospitality to co-workers from all parts of the world. The President, in proposing the English-speaking Ophthalmological Societies, emphasised the common inspiration of the peoples represented and the common purpose of the gathering. The complete ophthalmologist, he said, was a practitioner of medicine, a surgeon, a neurologist, a physiologist, a mathematician, a physicist, and above all, a pyschologist. Sir John Parsons, replying for the Ophthalmological Society of the United Kingdom, remarked that the Society, since its foundation in 1880, had gone on from success to success, an ascent which culminated in the Convention just concluded. America, which owed much to English ophthalmology, was now repaying that debt, not in gold, but in the coinage of inspiration returned. Dr. de Schweinitz, on behalf of America, and Dr. Gordon Byers, on behalf of the Dominions, thanked their hosts for their hospitality, and laid stress on the essential unity and similarity of outlook of all the English-speaking peoples. Mr. J. H. Fisher proposed the toast of the Guests, which was responded to by Sir George Wyatt Truscott, representing the City and Corporation of London, Sir Humphry Rolleston, representing the Royal College of Physicians, and Sir John Bland-Sutton, representing the Royal College of Surgeons. Mr. E. Clarke proposed the health of the President, Mr. Treacher Collins, whose name, he said, was known and respected where ophthalmology was practised and taught.

On Saturday, delegates visited Oxford, where they lunched at Keble College, or Cambridge, where they were entertained at Trinity College.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. J. O'Hea is placed on the Retd. List with the rank of Surg. Capt.

ROYAL ARMY MEDICAL CORPS.

Maj. and Bt. Lt.-Col. T. S. Coates to be Lt.-Col., vice Lt.-Col. C. G. Thomson, to retd. pay, on account of ill-health.

Temp. Capt. R. W. Markham (Dental Surg.) relinquishes his commn. on account of ill-health and retains the rank of Capt.

TERRITORIAL ARMY.

Lt.-Col. R. C. Dun, having attained the age limit, is retired and retains his rank, with permission to wear the prescribed uniform.

Lt.-Cols. G. C. E. Simpson and J. H. Ray to be Bt. Cols.

Capt. E. M. Douglas-Morris to be Maj. (Prov.).

Capt. E. M. Jenkins is retired and retains his rank.

Capt. F. E. H. Keogh to be Maj.

Lt. C. Alison resigns his commn. and retains his rank.

2nd Lt. H. E. Suter (late Middlesex Regt.) to be Lt.

Supernumerary for Service with the O.T.C.—A. S. Gough to be Lt. for service with the Medical Unit Univ. of London, O.T.C.

TERRITORIAL ARMY RESERVE OF OFFICERS.

W. M. Robertson (late R.A.) to be Lt.

ROYAL AIR FORCE.

Flight Lt. T. C. St. C. Morton is promoted to the rank of Squadron Leader.

We regret to announce the death in his seventy-sixth year of Lieutenant-General Sir Lancelotte Gubbins, formerly Director-General A.M.S.

Correspondence.

"Audi alteram partem."

IS THERE A SEASONAL PERIODICITY IN SERUM RASHES?

To the Editor of THE LANCET.

SIR,—During my last years in Glasgow a record was kept of the serum rashes which occurred in the diphtheria wards with a view to determine whether certain batches of serum gave rise to an unusually large number of rashes. Three serums were used, Burroughs Wellcome, Parke Davis, and Hoechst, these being given in different wards. After I came to London in 1914 the record was not continued sufficiently long to determine the point for which the recording was originally instituted, but the figures suggest another point which has not, so far as I know, been raised—namely, the seasonal periodicity of serum rashes.

In Table I. the monthly admissions from diphtheria with the number of rashes are given for the

TABLE I.

Month.	1913.		1914.		Total Cases.	Total Rashes.	Percentage of rashes.	Theoretical number.
	Cases.	Rashes.	Cases.	Rashes.				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Jan... ..	70	12	56	8	126	20	15·9	19·4
Feb... ..	52	14	42	2	94	16	17·1	14·5
March ..	69	12	43	10	112	22	19·6	17·2
April . ..	63	12	28	8	91	20	18·4	14·0
May. . ..	50	15	35	7	85	22	18·6	13·1
June . ..	49	11	27	3	76	14	18·4	11·7
July.. ..	46	6	31	4	77	10	13·0	11·8
Aug. . ..	59	1	21	—	80	1	1·3	12·3
Sept. . ..	77	11	48	5	125	16	12·8	19·3
Oct.	70	14	53	4	123	18	14·6	18·9
Nov. . ..	59	11	46	9	105	20	19·1	16·2
Dec... ..	74	4	34	3	108	7	6·5	16·6

years 1913 and 1914 in columns 1 to 4, and the totals in columns 5 and 6. In column 7 the percentage of the rashes occurring in the different months is given, and in column 8 the expected number of rashes if the frequency of rashes were uniform throughout the year. As the figures are small, they have been collected together in the four seasons of the year in Table II.,

TABLE II.

—	Cases.	Rashes.	Percentage of rashes.	Theoretical number.
Jan.–March ..	332	58	17·5	51·5
April–June ..	252	56	22·4	39·0
July–Sept. ..	282	27	9·5	43·5
Oct.–Dec. ..	336	45	14·8	52·0

in which the number of cases, the number of rashes, and the expected number of rashes are shown. When the ordinary χ^2 test of Pearson is applied to these figures it is found that χ^2 is equal to 14·3, a divergence which would only occur in three samples out of 1000 on the laws of chance. It is, therefore, strongly suggested that there is a seasonal variation in the frequency of serum rashes. This suggestion can be easily confirmed or refuted by those in charge of large hospitals. It is a point which has great importance in immunity and epidemiology. If this variation really exists it shows that susceptibility as determined by the seasonal changes in the environment may be sufficiently important to modify greatly the progress of an epidemic, so that the epidemic might even, in certain cases, depend more on the physiology of the host than on the infecting power of the organism. This seems the only conclusion, as it is very unlikely that serums stored in a cold chamber will alter in quality to any extent with the seasons of the year.

I hope this short note will result in a sufficient record of observations by those who possess the information, either to prove or disprove it.

I am, Sir, yours faithfully,
JOHN BROWNLEE, M.D., D.Sc.

National Institute for Medical Research, July 20th, 1925.

OATMEAL AND RICKETS.

To the Editor of THE LANCET.

SIR,—With regard to Prof. E. Mellanby's investigations on rickets, referred to in your issues of April 11th and May 23rd, 1925, I suggest that in view of the report by Messrs. Webster and L. Hill on "The Causation and Prevention of Rickets" (*British Medical Journal*, May 23rd, 1925, p. 956) the pro-rachitic effect of oatmeal is in all probability due to the very high percentage (5·9 per cent.) of fat which it contains, and the consequent formation by it in the intestines of insoluble calcium soaps which are excreted unabsorbed in the fæces. Prof. Mellanby himself considers that this pro-rachitic substance is "associated with the fatty acids" as it can be obtained by the saponification of oatmeal with soda and the extraction of the mixture with petrol-ether.

	Percentage content of fat in—							
	Oatmeal*	Maize*	Barley*	Rice*	Wheat*	Wheaten flour*	Germ of wheat†	White bread†
	5·9	4·3	1·6	0·3	1·7	0·9	13·1	0·46

* Feeds and Feeding, Henry (Madison, Wis., U.S.A., 1904).
† Notter and Firth, third edition, pp. 305 and 310.

From the table given above it will furthermore be seen that the pro-rachitic action of the cereals investigated by Prof. Mellanby (with the exception of wheat) corresponds in a striking manner to the percentage of fat which each contains. Differences in the chemical constitution of these fats may also partly account for the different rachitic values of the cereals in which they occur.

The rachitic action of wheat is somewhat anomalous; wheaten flour which contains 0·9 per cent. of fat is stated to be less rachitic than rice which contains only 0·3 per cent. of fat, yet bread made presumably from such flour, and containing approximately only half the percentage of fat of the original flour—i.e., 0·45 per cent.—was found to be markedly rachitic in action, puppies fed on large amounts of bread developing rickets "most readily"; moreover, the addition to the diet in quantity of the germ of wheaten flour which contains 13 per cent. of fat was found to interfere consistently with the proper calcification of bone.

I am, Sir, yours faithfully,
J. W. TOMB.

Mines Board of Health, Asansol, Bengal, India, June 25th, 1925.

THE DANGER OF INCOMPATIBILITY IN BLOOD TRANSFUSION.

To the Editor of THE LANCET.

SIR,—In treatment by transfusion of blood it is of the greatest importance to select a donor whose red cells are compatible with the serum of the patient. Neglect of such a precaution may entail serious symptoms and even death. Individuals who present themselves at hospitals as prospective donors may state that they belong to, say, group I. or group II. In an emergency such a statement might be accepted as true without further investigation—e.g., where the patient has recently been grouped as a precautionary measure, and if the *ascertained* group of this patient happens to be compatible with the *stated* group of the donor. Under such circumstances the transfusion might be proceeded with forthwith.

This letter is written in order to call attention to the need of not accepting too readily as actually true a statement from a donor with reference to his blood group. An example may make this clear. At a large London hospital it was decided to transfuse a patient. This patient had been grouped while in that hospital as group II. (using B. W. and Co.'s sera). A donor presented himself as available for this patient and stated that he himself was a group II., since his blood had been so grouped a fortnight previously at another large London hospital. As a precautionary measure the blood of the patient and of the donor were put up against each other, and that of the donor was also grouped by means of stock grouping sera (B. W. and Co.'s). It was then found that the donor's blood was (i.) incompatible with that of the patient, and (ii.) belonged to group III.

Had the donor's statement been accepted and the transfusion performed, a fatal result might have occurred. Such an incident suggests that the blood of patient and prospective donor should always be tested against each other. Further, the eye alone should not be depended on for detecting the presence of agglutination, but a strong lens or a microscope should be used, more especially if stock serum is used for grouping. A fatal result has occurred when the eye alone was depended on.

I am, Sir, yours faithfully,

E. L. HUNT,

Bacteriologist, St. George's Hospital, S.W. 1.

July 18th, 1925.

Parliamentary Intelligence.

HOUSE OF COMMONS.

WEDNESDAY, JULY 15TH.

Custard and Egg Powders.

Mr. WALTER BAKER asked the Minister of Health whether he had received a copy of the report on custard and egg powders which had been presented to the Monmouthshire County Council by the President of the National Analysts' Association; and whether, in view of the fact that these powders were in the main dyed starch and that six eggs to the ton was sufficient to comply with the law, he proposed to take any action.—Sir KINGSLEY WOOD (Parliamentary Secretary to the Ministry of Health) replied: Yes, Sir, my right hon. friend has received a copy of the report. He has no power to lay down any rules as to the composition of custard and egg powders so long as they are not injurious to health.

Sanitary Inspection of Offices.

Colonel DAY asked the Home Secretary if he was aware that divers Metropolitan borough councils had made representations suggesting that the sanitary officers should be empowered to inspect offices where wage-earners were employed in the same way as factories and workshops; and would he consider introducing legislation with a view to the protection which was afforded workers in factories and workshops being extended to office workers.—Mr. G. LOCKER-LAMPSON (Under Secretary for Home Affairs) replied: No such representations have been made to the Home Office, but I understand that representations to this effect have been received by the Ministry of Health from two of the Metropolitan borough councils. My right hon. friend is afraid he cannot promise any legislation in the direction suggested.

THURSDAY, JULY 16TH.

Publication of Trevethin Committee Evidence.

Mr. SNELL asked the Minister of Health whether Colonel Harrison, a permanent official of the Ministry of Health, was acting under instructions when, at the recent congress of the Royal Institute of Public Health, held at Brighton, he prevented Mr. Wansey Bayly, the hon. secretary of the Society for the Prevention of Venereal Diseases, from quoting evidence which was given before the Trevethin Committee, on the ground that such evidence was confidential; whether this evidence was in fact confidential; and would he undertake that permanent officials of his department, except when acting under his instructions, would not prevent valuable information on important health subjects from being given to the public by competent medical men.—Mr. NEVILLE CHAMBERLAIN replied: No instructions in this matter were given to the officer referred to. As regards the second part of the question, I am informed that no pledge was given to witnesses before the Trevethin Committee that their evidence would be regarded as confidential and not published, but the evidence has not been published and was not available to members of the congress, and its chairman ruled that quotations from such evidence would be out of order. I am unable to accept the implication conveyed in the last part of the question.

Uninsured Persons.

Mr. HERBERT WILLIAMS asked the Minister of Health the number of employed persons in this country not insured under the National Health Insurance Acts.—Mr. NEVILLE CHAMBERLAIN replied: No precise information of the kind desired by my hon. friend is available. The number of employed persons aged 12 or over in Great Britain in 1921, according to the census of that year, was 17,403,053, of whom it is estimated that 16,432,000 were over 16, and the estimated number of persons entitled to benefits under the National Health Insurance Acts in the same year was 15,134,000. The latter figure, however, includes some persons who had ceased to be employed, and for this and other reasons it is not directly comparable with the census figure. The balance of 1,298,000, therefore, is only a rough approximation to the number of uninsured employed persons, of whom the principal groups are non-manual workers earning more than £250 a year and persons engaged in excepted employment under the Crown and local authorities and certain statutory companies.

Health Visitor's Salary.

Mr. GERALD HURST asked the Minister of Health whether he was aware that the Dorset County Council was advertising for a health visitor at a salary of £148 a year, out of which the person appointed had to contribute £7 15*s.* a year towards the superannuation funds and to find her own bicycle; and whether, seeing that this salary, with its yearly increments, was far below the normal scale, he would draw this council's attention to the effect of its action upon the standard of trained nurses likely to be attracted into the public health service.—Mr. NEVILLE CHAMBERLAIN replied: Yes, Sir, I am in communication with the county council on the subject.

Optical Treatment for Panel Patients.

Mr. BLUNDELL asked the Minister of Health the difference between optical treatment, which was previously allowed to be given as an additional benefit under the Health Insurance Acts, and ophthalmic treatment, as now allowed.—Mr. NEVILLE CHAMBERLAIN replied: The difference is that with the new definition of the benefit it has been possible to make arrangements whereby an insured person is in a position to obtain the advice of an ophthalmic specialist when it is required in the opinion of his medical practitioner. Under the previous definition it was a matter of doubt how far this could be done.

Scarlet Fever from Ice-Cream.

Colonel DAY asked the Minister of Health if he was aware of the recent outbreak of scarlet fever in Portsmouth which was traceable to ice-cream made by one manufacturer in whose employ a boy assistant was found to be suffering from the disease; would he, in the interests of public health, make an order that early notice of any illness of the principals or employees of an ice-cream manufactory should be made immediately to the local medical officer of health, and that such notice should become obligatory; and would he consider the advisability of powers being vested in medical officers of health so as to allow the inspection of places where ice-cream was made, and inspection of persons occupied with the manufacture or distribution of ice-cream.—Mr. NEVILLE CHAMBERLAIN replied: I have received a copy of the report of the medical officer of health on the outbreak referred to. Provision is already included in the Infectious Disease (Notification) Act and in regulations made by my department for the notification of all cases of any of the principal infectious diseases, and a special provision is included in a Portsmouth local Act requiring manufacturers of and dealers in ice-cream to give notice of the outbreak of any such disease amongst their employees. I doubt whether it would be practicable to enforce a regulation that all cases of illness, however slight, should be notified. With regard to the regulation of places where ice-cream and other food is prepared, many local authorities in addition to the town council of Portsmouth have obtained special local Act powers as to ice-cream.

FRIDAY, JULY 17TH.

The Summer-Time Bill.

The Summer-Time Bill was considered on report.

On Clause 1 (which makes Summer Time permanent and extends the period prescribed in the previous Acts),

Sir H. CAUTLEY moved an amendment to leave out Subsection (2), the effect of which was to limit the period

of Summer Time to that fixed by the existing law—i.e., from 2 o'clock on the Sunday morning following the third Saturday in April to 2 o'clock on the Sunday morning following the third Saturday in September. He said that there was no objection to the proposal to make summer time perpetual; the only point of controversy was as regarded the date on which Summer Time should begin and end. The promoters of the Bill proposed to add about a fortnight at the beginning of the period, and a fortnight or three weeks at the end, making Summer Time finish on the first Saturday in October. Although a very good case could be made that no sufficient time had elapsed since the compromise of 1922, he felt that this was a matter which should, if possible, be amicably settled. The promoter of the Bill had made an offer which he thought generous, though he (Sir H. Cautley) could not accept it as such. This offer was to give up the early part of the period leaving the commencing date as at present, provided the opponents of the Bill would agree to the full period proposed by the Bill at the end—namely, the first Saturday in October. As chairman of the Conservative Agriculture Committee, he wished to say that they would accept that compromise if the House was willing to accept it. (Hon. Members: "No.")

DR. GRAHAM LITTLE said he wished to voice more especially the considered opinion of the medical profession inside and outside the House. Arguments in favour of the Bill seemed so overwhelming and objections so trivial that it was hard to understand why there should be any difficulty about it. This was a measure of far-reaching importance to the health and happiness of the community. It was really one of the most important Bills that had ever been before the House or the country. He would point out the profound significance of medical unanimity on this Bill. The British Medical Association in 1923 passed this resolution: "That the British Medical Association regrets that Summer Time has been curtailed this year, as it is our opinion that Summer Time is beneficial to the health of the nation." In 1921 the Society of Medical Officers of Health passed this resolution: "The Society regards the institution of Summer Time as a great benefit to the community as a whole and can find no sufficient evidence to support the view that it must prove detrimental to the health of infants and young persons." That resolution was confirmed in 1923 and 1924. In connexion with a deputation to the Home Secretary the medical officers of health brought to his notice the resolution. He (Dr. Little) had been connected with the staff of a London hospital for children, and he said without hesitation that the statements made about the difficulty of getting children to sleep was unmitigated "tosh." He urged very strongly that there should be no curtailment of the period of Summer Time.

After further discussion, the closure was moved by the promoter of the Bill (Lieut.-Colonel LAMBERT WARD), and on a division Sir H. CAUTLEY's amendment was rejected by 204 votes to 68.

An amendment in the name of Sir R. SANDERS, providing that Summer Time should begin on the third Saturday in April instead of the first Saturday as proposed in the Bill, was then agreed to without a division.

Sir H. HOPE moved a further amendment to fix the last Saturday in September instead of the first Saturday in October as the date of the termination of Summer Time, which after some discussion was defeated by 228 votes to 56. The Bill was then read a third time without a division.

Therapeutic Substances Bill.

Mr. NEVILLE CHAMBERLAIN (Minister of Health), in moving the second reading of the Therapeutic Substances Bill (which has already passed through the House of Lords), said he believed that it would have the assent of all parties inasmuch as it was no exaggeration to say that the lives of many people would benefit from its early passage into law. It dealt with the standardisation of vaccines, sera, toxins, antitoxins, antigens, and insulin. Practically all civilised countries had an official standardisation for these various substances and as to their purity and potency—France, Germany, Italy, Spain, the United States, Norway, Sweden. Preparations which had failed to pass the test of foreign countries were liable to be imported here. It was proposed that no one should be allowed to manufacture these substances without a licence. A joint committee would be set up consisting of the Minister of Health, the Secretary for Scotland, and the Home Secretary for Northern Ireland, with power to make regulations, to prescribe standards and tests, and from time to time to make conditions. Veterinary substances were excluded except in so far as might be necessary in certain cases.

Major-General Sir R. LUCE said in carrying this matter one stage further they had behind them medical and scientific opinion. The substances dealt with were medically roughly of three kinds. First there were those extremely difficult chemical compounds, such as salvarsan. The regulations under the Bill would help to make quite certain that these substances did not get into the hands of people who were not qualified to deal with them. He hoped that in committee it would be possible to add to the Advisory Committee a representative of the body of general practitioners who were directly responsible for the use of these substances, possibly nominated by the British Medical Association.

Colonel SINCLAIR said there was a time when the materials were for the most part inorganic, and could be standardised by tests, but they were getting right away from that now to the use of organic extracts, extracts from various glands in human beings or animals as substitutes for ordinary drugs. Obviously, these required to be subjected to physiological or chemical tests, and it was very important that they should be subjected to those tests by recognised authorities. There was, for example, pituitrin, an extract from a small gland in the brain. This was a very potent substance and was used for a variety of purposes. It was quite possible that practitioners using a particular brand of pituitrin might be quite accustomed to its effects, but in an emergency a man might use a brand which had not been adequately standardised and which might be five or ten times as strong as the brand with which he was familiar. In such a case where the intention was to stimulate a wound sufficiently to secure contraction, the effect of a drug of unknown strength might be to cause a rupture of the wound from over-stimulation. Another illustration was furnished by the valuable substance known as insulin. With the wider use of this drug other manufacturers of it would spring up and their products might be of various standards, and there might be preparations altogether too strong for general use. He cordially supported the measure.

Dr. VERNON DAVIES said the Bill was long overdue. He thought, however, that certain alterations would require to be made so that a serum which might be produced abroad, and had certain special properties, should be allowed to be brought in under licence without all the restrictions imposed by the Bill as it stood. He suggested that as many as possible of the Members of the House who were medical men should be placed on the committee to which the Bill was referred.

Mr. A. V. ALEXANDER, on behalf of the Labour Party, supported the Bill.

The Bill was read a second time and committed to a committee of the whole House.

Diseases of Animals Bill.

Mr. E. WOOD (Minister for Agriculture) moved the second reading of the Diseases of Animals Bill, a measure to provide for contributions to be paid out of moneys provided by Parliament as compensation for the slaughter of cattle in England and in Northern Ireland on the ground of disease.

Dr. VERNON DAVIES asked the Minister with regard to the provision as to the slaughter of cattle in case of the existence or suspected existence of tuberculosis what evidence he required? Was it to apply to tuberculosis of the udder with the consequent production of tuberculous milk, and the danger of communicating tuberculosis of the lungs, or was it to apply to tuberculosis of the lungs, and in that case would reliance be placed simply upon the tuberculin test? He also asked the Minister if he would bear in mind the possibility of vaccine treatment for these cattle, an experiment which he believed was just about to be commenced. If it were successful it would probably effect a great saving to the State.

Sir R. LUCE said that the tubercle was of two kinds. There was a distinct form of tuberculosis which might be absolutely local and not circulating in the blood at all and in no way affecting the eatable parts of the food. The muscle of the body which formed the largest portion of the food was very rarely infected with tubercle at all. There were, of course, cases in which the udder of the cow which was infected and produced tuberculous milk was practically the only part of the cow that was affected, and this class of cow might be the most important class to destroy as they were the most potent source of tubercle to children. But the rest of the carcass apart from the udder might be absolutely innocuous to the community. It would be a great waste that such animals should be completely destroyed.

Lieut.-Colonel FREMANTLE said he preferred to err on the side of safety, but it seemed to him ridiculous that they should go in for a policy of slaughter in these cases when they were on the brink of discoveries which would absolutely eliminate the necessity of slaughter. If meat was properly butchered and marketed there would not be the same danger of meat being unfit for consumption being exposed as food. If they took greater precautions they could allow a great deal of latitude. Although he believed this Bill was necessary and the compensation to be paid was necessary, he maintained that hand in hand with it the Ministry of Health should go forward with the policy of seeing that butchering was carried out on proper principles and of ensuring better veterinary inspection.

Mr. WOOD said he was satisfied on such inquiries as he had been able to make from the Minister of Health that

if the local authorities did their duty, as he had every reason to think they did, there was no meat passing into human consumption that was or might be prejudicial to human health. But if any case could be established that there was a chance of unsound meat being sold, he would be very willing in conjunction with the Minister of Health to take effective means to stop it.

The Bill was read a second time and committed to a committee of the whole House.

MONDAY, JULY 20TH.

Civil Service Pensions in India.

Sir CHARLES OMAN asked the Under Secretary of State for India whether European British subjects serving in the provincial services in India were entitled to retire on a proportionate pension, similar to that recommended by the Lee Report for the superior civil services; and, if not, whether any measures were contemplated for assimilating their position to that of the other civil services in this respect.—Earl WINTERTON replied: Eligibility under the Premature Retirement Rules is limited to members of the All India Services. No general extension of the right to retire under these rules is contemplated, but the Government of India is examining in consultation with local governments the possibility of entertaining applications from individual officers whose circumstances may appear to be of a very exceptional nature.

Burdens of the Milk and Dairies Act.

Mr. EVERARD asked the Minister of Health whether, in view of the burdens which the Milk and Dairies (Consolidation) Act, 1915, was likely to place on the owners and occupiers of agricultural holdings, he would consider the further postponement of the operation of this Act.—Sir KINGSLEY WOOD replied: I think my hon. friend is unduly apprehensive as to the probable effect of the Act on the owners and occupiers of agricultural holdings, and in view of its importance as a public health measure my right hon. friend cannot contemplate the introduction of legislation to provide for its further postponement.

Valuation of Approved Societies.

Mr. THOMAS WILLIAMS asked the Minister of Health whether the valuation of all approved societies under the National Health Insurance Act had taken place up to one period; if not, would increased benefits of societies whose valuation was delayed be made retrospective to July, 1925; and the reason why all valuations were not made at the same period and additional benefits made available at the same time for all members.—Sir KINGSLEY WOOD replied: For the purposes of the second valuation approved societies and branches were divided into two groups, to be valued respectively as at Dec. 31st, 1922, and Dec. 31st, 1923. For those which have been valued as at the former date the schemes of additional benefits following this valuation operate from July 6th, 1925, and for the other group the scheme will commence in July, 1926. These arrangements were agreed to by the Consultative Council representing approved societies of all types, and were found to be necessary in order to avoid either a considerable increase in the number of the valuers and their staff or alternatively a prolongation of the period elapsing between the date of valuation and the commencement of the additional benefits provided as the result of the valuation.

Coroners' Inquiries in Murder Cases.

Mr. DIXEY asked the Home Secretary whether he proposed to introduce legislation to remedy defects in coroners' inquiries in murder cases at an early date.—Sir W. JOYNSON-HICKS replied: Yes, Sir.

Further Accommodation for London University.

Dr. LITTLE asked the Secretary to the Treasury whether the Senate of the University of London had declined the offer of April, 1920, made by the then President of the Board of Education, of the Bloomsbury site; and whether the Treasury was prepared to entertain alternative proposals for increasing the present accommodation at South Kensington for the central offices of the University.—Mr. W. GUINNESS replied: The answer to the first part of the question is in the affirmative. In reply to the second part the Treasury have already informed the Senate of their willingness to consider any practicable alternative proposal for an increase, without undue cost, of the accommodation for the central offices of the University which the Senate feel able to suggest.

Export of Morphia to China.

Mr. SCRYMGEOUR asked the Secretary to the Treasury whether he was aware that packets of morphia, bearing the labels of three different London firms—namely, J. A. Wink and Company, manufacturing chemists, Battersea, P. Nicolaidi, and T. and H. Smith, Limited, 25, Christopher-street—were being exported for the purpose of being smuggled into China; and what steps were being taken in the matter.—Sir W. JOYNSON-HICKS replied: The answer is in the negative. The two first-named firms are not licensed to manufacture or deal in morphine and no licences for the export of morphine are granted them. In the case of the last-named firm, who are manufacturers of morphine, export licences would only be granted if my department is satisfied that the drug is required for medical or scientific purposes, but I think it is only right to say, in view of the fact that the firm's name is mentioned in the question, that I am not aware of any evidence to suggest that they have taken part in or connived at attempts to smuggle the drug into China or elsewhere. The hon. Member is probably aware that it is a common trick of the illicit dealers to put forged labels bearing the names of well-known firms on their wares.

Telephones and Rural Medical Service.

The House went into Committee of Supply on a vote of £32,958,000 for the salaries and expenses of the Post Office, including telegraphs and telephones, Captain FITZROY (Deputy Chairman of Committees) in the chair.

Mr. MACPHERSON said he was speaking for the whole of the Highlands where there were houses and small communities 20, 30, or 40 miles from the nearest doctor, and there was no possibility of any person who might be taken suddenly ill getting a doctor, or near one, without a telephone. The telegraph offices were closed at night and he knew of case after case of extreme hardship because of the lack of extension of the rural telephone system. He was sure the House would agree to any loss that might be caused by the extension of this system.

Sir R. HAMILTON, the Member for Orkney and Shetland, said that, as the Postmaster-General was aware, a petition had recently been sent to him from the island of Papa Westray which furnished a very good example of the difficulties which people suffered who lived in islands where there was no telephonic communication either with the mainland or the next largest island. Papa Westray was separated from the next largest island by a sound through which ran a strong current and it was dangerous for an open boat to cross at night in the winter. No doctor lived on the island, which had over 150 inhabitants, and it would be of inestimable advantage to them to be able to communicate by telephone with the doctor, not necessarily that the doctor should come across, but in order that he might have a statement of the case which would enable him to send over the telephone instructions as to how the patient should be treated.

Major PRICE said that in a village in North Pembrokeshire the other day two accidents happened within an hour or two. The nearest doctor was eight miles away. The telephone wire was down, as it had been very often. The only means of communication was by way of pony and trap. The patient had to be sent to the county hospital, which was 15 miles away, and there was a lapse of 11 or 12 hours before he could be got there, all of which might have been avoided if the telephone had been available. He urged the Postmaster-General to develop the telephone system so that it might be useful to the whole community, and specially to the rural community.

Mr. BUCHANAN urged the necessity for telephone kiosks, conveniently situated near the homes of the people so that they could use them, say, in connexion with a maternity case.

Lieut.-Colonel HENEAGE joined in the plea for increased telephone facilities and said in many villages at the present time the only way of summoning a doctor was by sending a man on a bicycle for him, with the result that sometimes the doctor was hours late in arriving.

Sir W. MITCHELL-THOMSON (Postmaster-General) said he appreciated as much as any hon. Member the importance of developing rural telephones. New rural exchanges were being opened at the rate of something like 20 per month. But he asked hon. Members not to press him too hard, as he had to consider the question of finance. Until the science of wireless telephony as opposed to wireless telegraphy had developed further he did not think it was practicable to instal wireless communication between the islands. So long as they were confined to wireless telegraphy the cost was out of the question.

TUESDAY, JULY 21ST.

Medical Treatment of Tuberculous Men.

Mr. GILLETT asked the Minister of Pensions if instructions had been sent to tuberculosis officers to intimate to their ex-service patients who had been under treatment for periods of from three to six years to get light work; and whether, seeing that some patients who had been so informed were advanced cases of tuberculosis and that with so many unemployed it was impossible for such ex-Service men to secure the light work ordered, he would withdraw these instructions.—Lieut.-Colonel G. F. STANLEY (Parliamentary Secretary to the Ministry of Pensions) replied: It would not be competent for the Ministry of Pensions to issue instructions to tuberculosis officers regarding the medical treatment of cases under their care, and no such instructions have been issued.

Sanatorium Treatment for Pensioners.

Mr. LAWSON asked the Minister of Pensions if he would say what was the number of pensioners in receipt of pension at 100 per cent. following a course of sanatorium treatment; and whether he would consider the desirability of granting the special rate of 100 per cent. to all men discharged from sanatoria irrespective of its being a first, second, or third course of sanatorium treatment.—Lieut.-Colonel G. F. STANLEY replied: About 10,000 men are in receipt of pension at the rate of 100 per cent. in respect of total disablement due to pulmonary tuberculosis; but I regret that I am unable to say how many of these fall under the special arrangement for men who have completed a course of sanatorium treatment. With regard to the second part of the question, my right hon. friend is in agreement with the reply given by his predecessor to a similar question on July 31st, 1924.

Medical News.

THE CONTRIBUTION OF OPTICAL INSTRUMENT MAKERS TO MEDICAL SCIENCE.—In his presidential address, delivered on July 23rd at a luncheon of the British Optical Instrument Manufacturers Association, Mr. F. Twyman, F.R.S., welcomed the most representative gathering of the optical instrument industry which has ever taken place. He dealt in succession with the contributions of this industry to various important sections of national life. Speaking of developments in the microscope, Mr. Twyman said that the series of apochromatic objectives now provided in this country are superior to any made abroad, adding that many who are doing exacting microscopic work are discarding foreign lenses for British. The important British work on filter-passing micro-organisms demanded, he said, accuracy of focusing and rigidity which was not provided by any existing stand, and such a stand had now been evolved in this country. Improvements in illuminating systems were, if anything, more important than those in objectives. The evolution of the dark-ground illuminator, permitting of the use of higher powers, had resulted almost immediately in the acquisition of new knowledge of disease. He mentioned the combined illuminator used in Mr. J. E. Barnard's work in which a high aperture dark-ground illuminator is mounted concentrically with an encircling quartz condenser. While the former secured visibility and was used to locate the micro-organisms, the latter transmitted ultra-violet light and secured an image on the photographic plate. Mr. Twyman pointed out how essential to medical research is an efficient optical industry. British investigators knew the limitations of their apparatus and just what their requirements were. They laid their knowledge and requirements before the instrument-maker and in a short time were supplied with the instruments that enabled them to go forward and obtain results. Most of the instrumental essentials for the recent work of Dr. Gye and Mr. Barnard were, he was glad to say, British, like the work itself.

BEIT FELLOWSHIPS.—At a recent meeting of the trustees of the Beit Memorial Fellowships for Medical Research the appointment of Mr. Edward Wood, M.P., as a trustee was recorded on the minutes. The annual report, read by the hon. secretary, Sir James K. Fowler, notes the appointment of Dr. David Keilin, the first senior fellow to be University Lecturer on Parasitology at Cambridge. Dr. V. D. Allison, while holding a junior fellowship, was appointed Lecturer on Bacteriology at Queen's University, Belfast; Dr. Robert Keith Cannan and Dr. Ethel M. Luce, at the termination of their junior fellowships, were elected to Rockefeller Medical Fellowships tenable in the United States; Mr. Frank Cook, a junior fellow, has been appointed assistant obstetric surgeon to Guy's Hospital; and Dr. John Maurice Campbell, a junior fellow, has been awarded the Radcliffe prize at Oxford. There is still urgent need, the report states, for additional lectureships, assistant professorships, and professorships, so that a future may be in prospect for those who have gone far to commit themselves to a life to be spent in teaching and research.

The following are the names of candidates elected to fellowships, together with an indication of their proposed research:—

Senior Fellowship.—Herbert Davenport Kay.

Fourth Year Fellowships.—Ernest Basil Verney and John Lewis Rosedale.

Junior Fellowships.—George Hardy Eagles, M.D. Toronto. The specific agglutinogenic properties of streptococcus scarlatinæ and the possible further specific grouping of hæmolytic streptococci occurring in other pathological processes.

Dorothy Mary Needham. (1) A study of the oxidation-reduction potential of various organisms and tissues—e.g., (*a*) leucocytes in health and disease; (*b*) comparison of cancer, normal, and embryonic tissue; (*c*) cells under the influence of ultra-violet light and sunlight—using the method of micro-injection of oxidation-reduction potential indicators. (2) A continuation of the study of the pancreatic factor inhibitory to lactic acid formation in muscle, the nature of its effect upon carbohydrate metabolism, and its relation to insulin.

Ernest Noble Chamberlain, M.B., Ch.B. (Hons.) Liverp., M.D. Liverp., M.R.C.P. Lond. (1) Effects of the anterior lobe of the pituitary gland on the liver and other organs of the body; (2) investigation of the relation of pituitary and other ductless glands to cholesterol metabolism, including the variations found in the various pathological syndromes of endocrine disorders; (3) studies in the inter-relations of the various ductless glands by experimental production of over-dosage with one member of the series.

Eric Newmarch Allott, M.B., B.Ch. Oxf. The Growth of Bacteria on Artificial Media. To attempt to grow bacteria on purely artificial media, consisting of simple compounds, such as simple sugars, amino-acids, and salts, with a view to studying (*a*) what compounds or types of compound are indispensable for bacterial growth; (*b*) the variations in the characters of the bacteria according to the medium in which they are grown.

Francis Charles Kelly, B.Sc. Aberd. To continue research on iodine metabolism, especially the iodine requirements of animals and the influence on nutrition of diets deficient in iodine: (1) Feeding experiments on small animals with varying amounts of iodine added to the diet; (2) estimation of the iodine content of thyroid glands of animals fed on different diets; (3) determination by balance experiments of the influence of iodine on mineral metabolism, and especially the protein metabolism.

Derek Ernest Denny-Brown, B.M., B.Ch. New Zealand. To investigate spastic paralyses, decerebrate rigidity, and allied conditions, more particularly with regard to the influence of the sympathetic nervous system upon them.

Benjamin Stanley Platt, M.Sc. Leeds. The Relationship Existing Between the Formation of Peroxides by Bacteria and Certain of the Phenomena of Immunity. (*a*) An attempt to determine whether some constituents of bacteriological media promote peroxide formation by bacteria more than others, and, if such exist, whether they have any influence on the course of pneumococcal infections in animals; (*b*) a study of the interactions between bacterial peroxides and leucocytic oxidases as they affect the life of bacteria.

ROYAL SOCIETY OF MEDICINE.—The annual report of Council presented to the general meeting of Fellows on July 1st shows a membership of over 4000, being 400 more than in the first year of war. Over 3000 books have been added each year to the library, which was frequented in the last 12 months by 20,000 readers. In 1914 9000 books were borrowed, and last year 13,000. At the annual meeting the treasurers reported the finances to be in a strong position. A committee is at present engaged in studying further developments in the printing and publishing of the Proceedings.

THE House of the Royal Society of Medicine will be closed during the whole of August for cleaning and repairs.

ACCUMULATED FUNDS OF APPROVED SOCIETIES: DEPUTATION TO THE MINISTER OF HEALTH.—Mr. Neville Chamberlain received on July 20th a deputation representing, amongst others, the following bodies: Hearts of Oak Benefit Society, National Association of Employees' Approved Society, National Conference of Friendly Societies, National Conference of Industrial Assurance Approved Societies, National Deposit Friendly Society, National Union of Railwaymen Approved Society, Rural Workers Approved Society.

Mr. Meller, M.P., Mr. Oakley, M.P., and Mr. Blundell, M.P., and Sir Thomas Neill, who spoke for the approved societies, said that suggestions had been made in the press and in Parliament that part of the burden imposed on industry by the Contributory Pensions Bill could and should be removed either by taking money from the accumulated funds of approved societies or by lowering the contributions. The argument was that the size of the funds that had accumulated indicated that the difference between the income and expenditure was far larger than was required by the needs of the case, and that the insured person would readily agree to any reduction in the benefits that he might receive in exchange for a lessening of the contribution which he, in common with his employer, must pay. Their answer to this argument was that the funds that had accumulated were held in trust for the insured person, by whom, or on whose behalf, they had been paid, and that the possibility of paying additional benefits which had been provided for in the original Act and on the basis of which a number of societies had been formed for those occupations in which sickness incidence was small was a fundamental part of the scheme. They were anxious to receive an assurance from the Minister that he had not been shaken by the widespread attempt that was being made to tamper with the funds of approved societies.

The Minister, in reply, promised to deal with this matter on the third reading. Until what they described as "the attack" had been developed, he could not predict to them what line he would have to take in meeting it, but he could inform them that he was well aware of certain fundamental considerations, such as that the fund from which it was proposed to draw money for the relief of industry was not an aggregate fund, but merely the sum of a number

of separate funds belonging to different approved societies. Nor, on the other hand, had those who were suggesting either of these methods of relief indicated what the starting-point was to be—whether the additional benefits given as a result of the first valuation or as a result of the second valuation were to be treated as inviolable. The only assurance that in the nature of things it was possible for him to give them at the present moment was that he would be a party to nothing which would endanger the solvency of societies or involve breach of pledges given by successive Governments.

ROYAL COMMISSION ON NATIONAL HEALTH INSURANCE.—At the thirty-eighth meeting of the Commission, besides those already mentioned, evidence was given by the Joint Tuberculosis Council, represented by Sir Henry Gauvain and Dr. G. Lissant Cox, on the need for amendment in the treatment and cash benefits of insured persons suffering from tuberculosis. Mr. Walter Farris was examined on his scheme for fundamental alterations in the financial structure of the scheme.—The thirty-ninth meeting of the Commission was held at the Home Office, Whitehall, on July 14th, Prof. Alexander Gray in the chair. Evidence dealing with the constitution of the Central Fund, the methods of audit of approved society accounts, the accumulation of cash benefits in respect of persons in institutions, and the provision of dental benefit was submitted by Mr. William McLean on behalf of the Grand United Order of Oddfellows Friendly Society. The United Patriots National Benefit Society, represented by Mr. J. M. Roberts, gave evidence recommending the provision of curative treatment at the British spas as a benefit for members of approved societies suffering from rheumatic diseases, this evidence being supported by Dr. Fortescue Fox, past President of the International Society of Medical Hydrology, and Mr. John Hatton, secretary of the British Spas Federation. Thereafter Miss M. A. Hilbery gave evidence as to delays and irregularities in payments of cash benefits.—The fortieth meeting of the Commission was held at the same place on July 16th, Lord Lawrence of Kingsgate in the chair. Evidence was given by Mr. H. Lesser, on behalf of the London Insurance Committee, as to the powers and duties of the Committee and methods of improving the medical benefit service. Mrs. Hubback, representing the National Union of Societies for Equal Citizenship, put forward proposals for improving the position of women under the Act. The Standing Joint Committee of Industrial Women's Organisations, represented by Dr. Marion Phillips, submitted recommendations for extending medical benefit to dependants and widening its scope, for increasing the cash benefits, and for pooling the surpluses of approved societies. Thereafter Mr. W. A. Middleton, acting chief auditor of the National Insurance Audit Department, described the detailed arrangements for audit of the accounts of approved societies and insurance committees.

CANADIAN MEDICAL ASSOCIATION: ANNUAL MEETING AT REGINA.—Delegates from the British, American, and Chinese medical associations were present at the fifty-sixth annual meeting of the Canadian Medical Association held in Regina, Saskatchewan, under the presidency of Dr. David Low (Regina) in the first week of July. A grant of $30,000 (£6000) offered by the Sun Life Assurance Company of Canada to carry on post-graduate extension lecture courses throughout the Dominion was accepted by the Association. The organisation will be directed mainly towards helping the medical man in rural areas to keep abreast of medical advance of medicine. The report on medical education submitted by Dr. D. J. McLean (Winnipeg) emphasised the need for turning out practitioners qualified to render public service, rather than purely scientific men. Dr. T. C. Routley (Toronto), secretary of the Association, announced the opening of negotiations with the Royal College of Surgeons of England for the admission of Canadian medical graduates to membership of the College on easier terms. Dr. M. M. Seymour (deputy Minister of Health for Saskatchewan) foretold the time when communicable diseases would cease to menace mankind. Dr. Forest Leader (Victoria, B.C.) was chosen as president-elect for 1926–27, Dr. A. Primrose (Toronto) as chairman of Council, and Dr. A. T. Bazin (Montreal) as treasurer. Dr. Routley continues to hold office as general secretary. The executive committee is constituted as follows: Dr. David Low, Dr. Forest Leader, Dr. A. T. Bazin, Dr. T. C. Routley, Dr. W. G. Reilly (Montreal), Dr. G. S. Cameron (Peterboro, Ont.), Dr. T. Glenn Hamilton (Winnipeg), Dr. C. F. Martin (Montreal), Dr. J. G. Fitzgerald (Toronto), Dr. G. S. Young (Toronto), Dr. J. S. McEachern (Calgary), Dr. G. S. Seymour (Regina), Dr. F. N. G. Starr (Toronto), and Dr. S. L. Walker (Halifax). Dr. A. D. Blackader (Montreal) was reappointed editor of the *Canadian Medical Association Journal*, with Dr. Bazin as managing editor. Dr. W. H. McGuffin (Calgary) was chosen as president of the Canadian Radiology Society, and Dr. G. C. Brooks (Montreal) continues to act as secretary-treasurer. Victoria, British Columbia, will be the place of meeting in 1926, and the Canadian Radiology Society will meet at the same time and place.

THE King has appointed Sir Thomas J. Horder, Bart., a Knight Commander of the Royal Victorian Order.

CLIMATOLOGICAL CONGRESS AT DAVOS.—The Congress organised by the Davos Institute for Alpine Physiology and Tuberculosis Research will be held, as already announced, from August 16th to 22nd. The programme includes nearly 50 papers and demonstrations distributed among four sections: General, physical-meteorological, biological, and clinical. Dr. Carrière, head of the Swiss Public Health Department, will open the Congress with an address on the Relationship between the Various Climates of Switzerland and the Health of the Population. In the same section Dr. R. King Brown (London) will speak on the Climate of a Big City, and other speakers will include Prof. Dietrich (Berlin), Prof. Hellpach (Karlsruhe), Prof. Levi (Rome), and Dr. Wehrli (Zurich). In the clinical section Dr. Leonard Hill and Sir Henry Gauvain are announced to speak. Membership cards at a cost of 20 (Swiss) francs may be obtained on application at the Davos Research Institute, members being entitled to reduced railway fares and special terms for hotel accommodation.

AMSTERDAM INDUSTRIAL CONGRESS.—The Fourth International Medical Congress of Industrial Accidents and Diseases will take place in Amsterdam from Sept. 5th to 12th next, opening at 3 P.M. on Saturday, Sept. 5th, when the national exhibition will be inaugurated. On Monday, at 2.30 P.M., the ceremonial opening of the Congress takes place, followed by a banquet to the official representatives. At the plenary session on Tuesday morning, Prof. B. Cuneo (France), Dr. L. Teleky (Germany), Prof. J. Glaister (England), Dr. L. Heijermans (Holland), and Dr. F. Zollinger (Switzerland) will take part. Afterwards the Congress breaks up into collateral sections of industrial accident and industrial disease, in each of which papers will be read covering a wide range of subjects. At the plenary session to be held at The Hague on Saturday, Sept. 12th, Dr. Allers (Austria), Sir Thomas Oliver (England), Prof. L. Devoto (Italy), and Dr. A. Oller (Spain) will take part. The programme and further information may be obtained in this country from Dr. H. Menko, hon. sec. to the British Executive Committee, at 2, Grosvenor-gardens, London, N.W. 2.

THE LATE DR. G. S. SIMS.—George Samuel Sims, who died recently at Derby at the age of 70, qualified in 1884 with the L.S.A., having been educated at Owens College, Manchester, and at St. Thomas's Hospital, London. Four years later he obtained the M.R.C.S. and L.R.C.P. Lond. and graduated M.D. Durh. in 1900. For more than 30 years he was district medical officer to the Derby Board of Guardians and for nearly as many medical officer to the Liversage Charity. He was at one time President of the Derby Medical Society. At the outbreak of war, in spite of his age, he volunteered for service with the R.A.M.C., and did valuable work both at home and abroad. His surviving sons, Dr. G. H. Sims and Dr. T. H. Sims, both follow their father's profession.

FACULTY OF MEDICINE, VIENNA.—The Dean of Vienna University announces the following forthcoming courses: (1) Eighteenth International Advanced Course for Practitioners, Sept. 14th to 26th inclusive, covering the most important medical problems of to-day. (2) Practical Training Course for Students, Sept. 25th to Oct. 2nd inclusive. Applicants should send names, titles, and addresses in writing to Dr. A. Kronfeld, Sekretär der Internationalen Fortbildungskursus, Wien IX., Porzellangasse 22. (3) International Advanced Course in Dermatology and Syphilis, Nov. 23rd to Dec. 6th. Apply Dr. Kronfeld. (4) Special General Courses and Group Courses every month. Apply Das Bureau der Wiener Arztekurse, Wien VIII., Schlösselgasse 22. The Society for the Study of Digestive and Metabolic Diseases are also meeting from Sept. 30th to Oct. 3rd. Inquiries to Prof. Dr. Fuld, Berlin W. 15, or to Dozent Dr. Lugen, Wien XI., Alserstrasse 4 (Klinik Ortner).

MANCHESTER BABIES' HOSPITAL.—The medical report for 1924 shows that 223 children were in the hospital during the year, the average period spent there being 54 days for all cases and 36·7 days for fatal cases. There were 36 deaths, of which 16 were due to pneumonia, 11 to dyspepsia, 3 to tuberculosis, 2 each to status lymphaticus and congenital heart disease, and 1 each to cerebral abscess and congenital syphilis. Two deaths took place within 48 hours of admission. Research on the use of oxygen administration in the treatment of atrophic infants has been continued, the results having warranted the provision of a third special cot. The new buildings were practically finished when the report was written. The new wards include sun parlours and verandahs opening into the garden on the south side. Not only can 80 babies be taken, instead of 50 as hitherto, but the X ray, massage, and mercury-vapour lamp departments, which have been handicapped by seriously cramped conditions, will now be able to work in their own special quarters, to the benefit of both patients and staff.

THE SALVATION ARMY MOTHERS' HOSPITAL EXTENSION.—The new buildings of this institution at Lower Clapton-road were opened by the Queen on July 16th, among those presented to Her Majesty being Lady Barrett, who is head of the medical staff. The hospital additions include two new bungalow blocks, which increase the accommodation from 60 to 90 beds. These blocks are models of sunny spaciousness, the approaches and adjuncts being built with an eye to the mothers' comfort and convenience and to the staff's fullest efficiency. Another important new feature is a specially designed and fully-equipped operating theatre—a feature the hospital has hitherto lacked and has greatly needed. Other departments of the hospital have been renovated and re-decorated, the total cost being £17,500.

PROFESSIONAL AND BUSINESS WOMEN'S HOSPITAL LEAGUE.—The annual report for the year ending Dec. 31st, 1924, states that 548 new members (50 of them students) joined during the year, making the total number 2008. The schedule of sickness and disease recognised by the League includes all cases which a general hospital will admit, and excludes mental illness, infectious disease, rest cures, and cases not sufficiently serious to be admitted to hospital. The ordinary benefits available are: 1. Four weeks' treatment in a hospital specified by the committee, either in London or in the provinces. 2. Free consultation with a gynæcologist, should this be necessary. 3. A reduction of cost on surgical instruments. Grants have been given for massage, X ray treatment, surgical splints, and help towards the cost of instruments. Up to the present it has been found impossible to give grants for specialists' fees. The subscription is now 7*s.* 6*d.* a year, and every member receives a numbered membership card. During the year 32 members underwent treatment at hospitals in London, 11 in the provinces; grants were made to 42 others. Fourteen applications were refused, 7 were considered ineligible, and 11 were withdrawn. The Secretary of the League is Miss P. Strachey, at 35–37, Marsham-street, Westminster, S.W. 1.

Medical Diary.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.

MONDAY, July 27th, to FRIDAY, July 31st.—WEST END HOSPITAL FOR NERVOUS DISEASES, 73, Welbeck-street, W. A Special Course of Lectures, including clinical demonstrations upon selected cases, will be given at the Hospital at 5 P.M. as follows: Monday, Dr. Carnegie Dickson on The Pathology of the Cerebro-Spinal Fluid; Tuesday, Dr. Hildred Carlill on Lesions of the Cranial Nerves; Wednesday, Mr. Lindsay Rea on Ocular Manifestations of Nervous Disease; Thursday, The Registrar on Common Neuroses; and Friday, Dr. C. Worster-Drought on Clinical Forms of Neuro-syphilis.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.

MONDAY, July 27th.—11 A.M., Surgical Registrar: Surgical Wards. 12 noon, Mr. Simmonds: Applied Anatomy. 2 P.M., Mr. Donald Armour: Operations.

TUESDAY.—10 A.M., Mr. Steadman: Dental Dept. 2 P.M., Mr. Addison: Operations. 3 P.M., Dr. Pritchard: Medical Wards.

WEDNESDAY.—11 A.M., Medical Registrar: Medical Wards. 12.15 P.M., Dr. Burnford: Medical Pathology. 2 P.M., Dr. Owen: Medical Out-patients.

THURSDAY.—11 A.M., Sir Henry Simson: Gynæcological Wards. 12 noon, Surgical Registrar: Surgical Pathology. 2 P.M., Mr. Bishop Harman: Eye Dept.

FRIDAY.—10.30 A.M., Dr. Dowling: Skin Dept. 12 noon, Dr. Pritchard: Modern Methods in Medicine. 2 P.M., Mr. Vlasto: Throat, Nose, and Ear Dept.

SATURDAY, August 1st.—10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations of the Throat, Nose, and Ear.

Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

Appointments.

HAMILTON, W., M.B., Ch.B. Glasg., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Loanhead District of the County of Edinburgh.

Queen Charlotte's Maternity Hospital, Marylebone-road: LANKESTER, A. L., M.R.C.S., L.R.C.P. Lond., Assistant Resident Medical Officer.

Royal Chest Hospital, City-road, E.C.: GREENSLADE, C. M., M.B., Ch.B. N.Z., F.R.C.S., WILLIAMS, H. LESTER, M.B., Ch.B., F.R.C.S., Assistant Surgical Officers; and KERLEY, PETER, M.B., Radiologist.

Vacancies.

For further information refer to the advertisement columns.

Barbados General Hospital.—Sen. Res. Surg. £330. Jun. Res. Surg. £300.

Barnsley and Wakefield Joint Sanatorium.—Asst. Tub. O., &c. £450.

Birmingham Cripples' Union and Royal Orthopædic and Spinal Hospital.—Jun. H.S. £150.

Bournemouth, Royal Victoria & West Hants Hospital.—Hon. Med. Clin. Asst., Surg. Clin. Asst., Ophth. Clin. Asst. Also Hon. Asst. S. and Hon. Asst. P.

Brighton, Lady Chichester Hospital.—H.P.

Brighton, New Sussex Hospital.—Temporary Dental Surgeon.

Bristol, Cossham Memorial Hospital, Kingswood.—Res. M.O. £150.

Cairo, School of Dental Surgery.—Supt. and Lecturer in Metallurgy, &c. £E.900. Lecturer in Surg. £E.480. Asst. Lecturer in Surgery. £E.360. Lecturer in Mechanics. £E.480.

Cumberland and Westmorland Mental Hospital, Carlisle.—Jun. Asst. M.O. £350.

Hertford County Sanatorium, Ware Park, near Ware.—Asst. M.O. £350.

Hong Kong University.—Reader in Biology. £600.

Liverpool County Borough.—Jun. Asst. Sch. M.O. £600.

Liverpool, Royal Children's Hospital.—Two Res. H.P.'s and Two Res. H.S.'s. Each at rate of £60.

Liverpool University.—Professor of Entomology. £800.

London Hospital, E.—First Asst. and Reg. £200 for six months.

London School of Hygiene and Tropical Medicine.—Lecturer on Tropical Hygiene. 200 guineas.

Manchester, Ancoats Hospital.—Pathological Registrar. £100.

Manchester Royal Infirmary.—Second Surg. Reg. £150.

Ministry of Pensions.—Part-time Surgical Supervisor of Orthopædic Clinics. £500.

Mount Vernon Hospital, Northwood, Middlesex.—Surg. Laryngologist.

Pietermaritzburg, Grey's Hospital.—Male H.S. £500.

Rochester, St. Bartholomew's Hospital.—H.P. at rate of £200.

Royal Chest Hospital, City-road, E.C.—Asst. Tub. O. £550.

Royal Northern Hospital, Holloway, N.—Anæsth. £10 10*s.*

Salford Royal Hospital.—Radiologist. £300.

Samaritan Free Hospital for Women.—H.S. at rate of £100.

Staffordshire Mental Hospital, Cheddleton, Leek.—Jun. Asst. M.O. £350.

Sudan Government, Wellcome Tropical Research Labs., Khartoum.—Asst. Bacteriologist. £720.

Willesden General Hospital.—Hon. Anæsth.

Worcester General Infirmary.—Jun. Res. M.O. £120.

Births, Marriages, and Deaths.

BIRTHS.

ANDREWS.—On July 19th, at 152, Harley-street, W. 1, to Helen, wife of J. Alban Andrews, *M.C.*, F.R.C.S.,—a daughter.

DICKSON.—On July 21st, the wife of W. Muir Dickson, F.R.C.S., of a daughter.

LOCK.—On July 17th, at Glyngarth, Soho-hill, Birmingham, the wife of J. Lewis Lock, M.A., M.B., of a daughter.

MOODIE.—On July 15th, the wife of Dr. William Moodie, of Horton, Epsom, of a daughter.

NORMAN SMITH.—At "Stone Field" Maternity Nursing Home, Kidbrook Crone, Blackheath, on July 15th, to Molly (née Terraine), wife of Dr. Norman F. Smith (Khartoum), the gift of a daughter.

RAVEN.—On July 11th, at Victoria-parade, Broadstairs, the wife of Martin O. Raven, M.D., of a daughter.

WATSON.—On July 18th, at Del Rey House, Cheltenham, the wife of Lieut.-Colonel C. H. Watson, D.S.O., I.M.S. (retd.), of a daughter.

MARRIAGES.

STUTTAFORD—ROYDEN.—On July 16th, at the Parish Church, Flegg Burgh, Norfolk, W. J. E. Stuttaford, *M.C.*, M.R.C.S., L.R.C.P., to Marjorie, only daughter of Dr. and Mrs. Royden, of Flegg Burgh.

WAKELEY—NICHOLSON-SMITH.—On July 21st, at St. Margaret's Church, Lee, S.E., Cecil P. G. Wakeley, F.R.C.S., of 5, Devonshire-place, W., to Elizabeth Muriel, only daughter of Mr. and Mrs. James Nicholson-Smith, of Blackheath.

DEATHS.

BEDDARD.—On July 14th, Frank Evers Beddard, D.Sc., F.R.S.

DUNCAN.—On July 15th, at Margate, Horace Duncan, B.A. Camb., M.B. Lond., son of the late James Duncan, M.D., of Henrietta-street, Covent Garden, London, in his 64th year.

EVANS.—On July 18th, at Danygraig, Burry Port, Surg.-Lieut.-Colonel Evan Evans, T.B., M.B., F.R.C.S., D.P.H., of Llanelly, in his 72nd year.

FRY.—On July 14th, at his residence, Old Town, Clapham Common, John Marchant Fry, L.R.C.P. Lond., in his 62nd year.

HENDRIKS.—On July 17th, at Bicester, Cecil Morgan Hendriks, O.B.E., M.B., M.R.C.S., in his 70th year.

WILLIAMS.—On July 13th, at Colwyn Bay, W. M. Venables Williams, L.R.C.P., L.R.C.S., D.P.H., J.P., in his 68th year.

*N.B.—A fee of 7*s.* 6*d.* is charged for the insertion of Notices of Births, Marriages, and Deaths.*

Notes, Comments, and Abstracts

INFECTION BY BOOKS.

BY J. E. MCCARTNEY, M.D., D.SC. EDIN.,
DIRECTOR OF RESEARCH AND PATHOLOGICAL SERVICES, METROPOLITAN ASYLUMS BOARD.

THE method of spread of infectious disease is a subject of great importance, particularly from the point of view of prevention, and in order to ensure that an epidemic shall be properly controlled all the various methods of its dissemination must be considered.

Owing to the lack of knowledge of the biology of the causal agents of certain infectious diseases it is very difficult, if not impossible in many cases, to state whether the infective agent is present in an active state or not. It is obvious that the answer to such a question is of supreme importance, for if the virus is active then vigorous steps must be taken for its destruction, whereas if the causal agent of the disease is inactive then there is no dnger of the infection spreading.

The Problem.

A possible means of spread of infectious disease is by means of books—particularly library books. Briefly, the problem is as follows: A book has been borrowed from a public library and is taken to a house in which infectious disease is either present at the time or occurs while the book is there. The book, which may or may not be read by the patient, is returned to the library and is almost immediately taken out by another person to a house in which some of the inmates are susceptible. Is there a danger of infectious disease being carried from the one house to the other by means of the book? If books do carry infection then the possibility of spread of infectious disease may be great owing to the wide circulation which a public library enjoys. The precautions necessary for the prevention of such a means of spread must be thorough, involving the expenditure of much time and money. If, on the other hand, the chances of spread of infection are minimal, then the energies of those responsible for the control of disease can be expended more profitably in closing the known avenues of spread.

Various Possible Infections.

Of the infectious diseases *small-pox* must be considered separately owing to its virulent nature. Some observers have recorded instances where it would appear that small-pox has been conveyed by books and by letters, but this method of spread has not been conclusively proved. Although the virus of small-pox is comparatively short-lived outside the body, yet the amount of virulent material necessary for infection is extremely small, and while the chances of disseminating small-pox by means of books are not great, yet we must assume, in the absence of definite information, that there is always the possibility of such spread. This information could only be obtained by extended human experiment, which is, of course, out of the question.

Owing to the virulent nature of the disease and the dire consequences of its spread, no risks whatever can be taken with small-pox, and in the light of our present knowledge all books, letters, papers, &c., must be considered as potential means of conveyance of small-pox infection and should be rigorously destroyed.

With regard to exanthematous diseases such as *measles*, *rubella*, and *chicken-pox*, our knowledge of the nature of the infective agents is extremely scanty. The biology of these viruses is unknown and their period of survival outside the body can only be conjectured. It is not possible to transmit any of these diseases to animals, and in consequence experimental work is out of the question, and precise facts as to infectivity could only be obtained by carefully controlled investigations on the human subject. It is known, however, from clinical observations that these viruses are extremely short-lived outside the body, and their period of infectivity under these conditions is probably only a few hours. It is also known that the virus, in the case of measles and rubella, is present in the naso-pharyngeal secretions, and in order definitely to infect a book, the patient would have to be in the early stages of the disease and to cough or sneeze thoroughly into its pages. From our available knowledge it would appear that even if the book were infected with virulent material, the viruses would die out in a comparatively small time, and that the chance of spread of infection by this means is remote. No definite evidence has been produced, as far as we know, that measles, rubella, or chicken-pox has been transmitted through the agency of books.

Scarlet fever, though an infectious disease, is nothing like so infectious as measles. The naso-pharyngeal secretion is infective, and the causal agent may be disseminated by coughing and sneezing. If the ætiological agent of the disease is as recent work would indicate, the streptococcus, then it is known that this organism will survive drying only for a short time, and even if found viable outside the body, may not necessarily be virulent.

Investigations could be made on the period of survival of the streptococcus in infected books, and the length of time the organism is viable under the conditions under discussion could be ascertained.

In *diphtheria* the causal organism is known and its period of survival outside the body has been determined. Dried diphtheria membrane kept in the absence of light has been found to contain living virulent bacilli after several months, but that the organism would survive for that length of time under the usual conditions in which a book becomes infective is doubtful. The fact remains that books have not been definitely proved as a source of transmission of diphtheria, and if transmission does occur it is difficult to prove.

Limits of Our Knowledge.

There are numerous methods of spread of infectious disease, many of which we do not know, and a possible means is not necessarily the probable one.

The question of spread of infection by books was recently discussed by the Society of Medical Officers of Health.[1] The general opinion was that there was no knowledge that infection was conveyed through books, but in the light of uncertainty definite measures should still be taken to prevent the possibility of spread of infection.

This summary indicates the view that must be taken in consideration of the meagre knowledge we possess regarding the spread of infectious disease. Apart from small-pox, the chance of infection by books is extremely small, but the medical officer should take no risks and should deal with the books as if they were infectious. In conclusion, it may be stated that it is extremely improbable that library books play an active part in the dissemination of infectious disease.

HEALTH AND HOMECROFTING.

THE close connexion which exists between the food of the people and the public health gives a scheme of homecrofting put forward by Prof. J. W. Scott an important medical aspect. The scheme has been clearly explained in a recent booklet.[2] Opportunity has now arisen for putting it to a practical test on the outskirts of Cheltenham; and Mr. J. St. Loe Strachey in the *Spectator* of July 11th has given the project his wholehearted support.

Homecrofting is in essence organised allotment gardening where each artisan dwelling has attached to it about one-third of an acre of land. At first the way to cultivate the land is taught by a skilled overseer, but each tenant should soon by his own labour be able to become independent of the greengrocer. The scheme plans for older school-children to be sent in rotation every third week to be taught homecrofting; how to prepare and manure the land; what succession of crops to sow; how to keep and feed rabbits, fowls, goats, and perchance a pig. Each time they return they would see the progress since they left and so be able to appreciate the value of their work. Thus a future generation would be educated for becoming scientific homecrofters, practising "subsistence agriculture," instead of being merely industrial consumers of food imported from abroad.

"Homecrofting," writes Prof. Scott, "is the art of making your own food with your own hands, so that you do not need to buy it. The suggestion is, take advantage of the short industrial hours. Aim at two shifts a day for the man: one shift at industrial work, earning wages, and another shorter shift, with his wife and children in his garden, producing food.

"A final way of escape from hunger. Wherever you have that you have a solution of the unemployment problem. That is what the homecroft plan tries to present."

In these days of short working hours and unemployment this scheme presents an ideal method for filling up leisure time. No form of recreation is healthier or more interesting than gardening. No vegetables ever taste so good as your own; no eggs are ever so fresh. Nevertheless, the plan is put forward, in the main, not for health purposes, but for economic and social reasons.

The first trial is to be on 18 acres, if the needed capital, £2500, can be raised. As the money will be invested in land and cottages, contributors, even if the experiment fail totally, will not lose all they invest. It is a worthy attempt to do something to rectify present social and industrial difficulties. The *Spectator* undertakes to receive and pass on any subscriptions and is offering prizes to the best homecrofters.

[1] Public Health, 1923–24, xxxvii., 265, 295, 296.
[2] Unemployment: A Suggested Policy. By J. W. Scott. London: A. and C. Black. 1s.